IBM Software Group

How to effectively manage an SOA architecture

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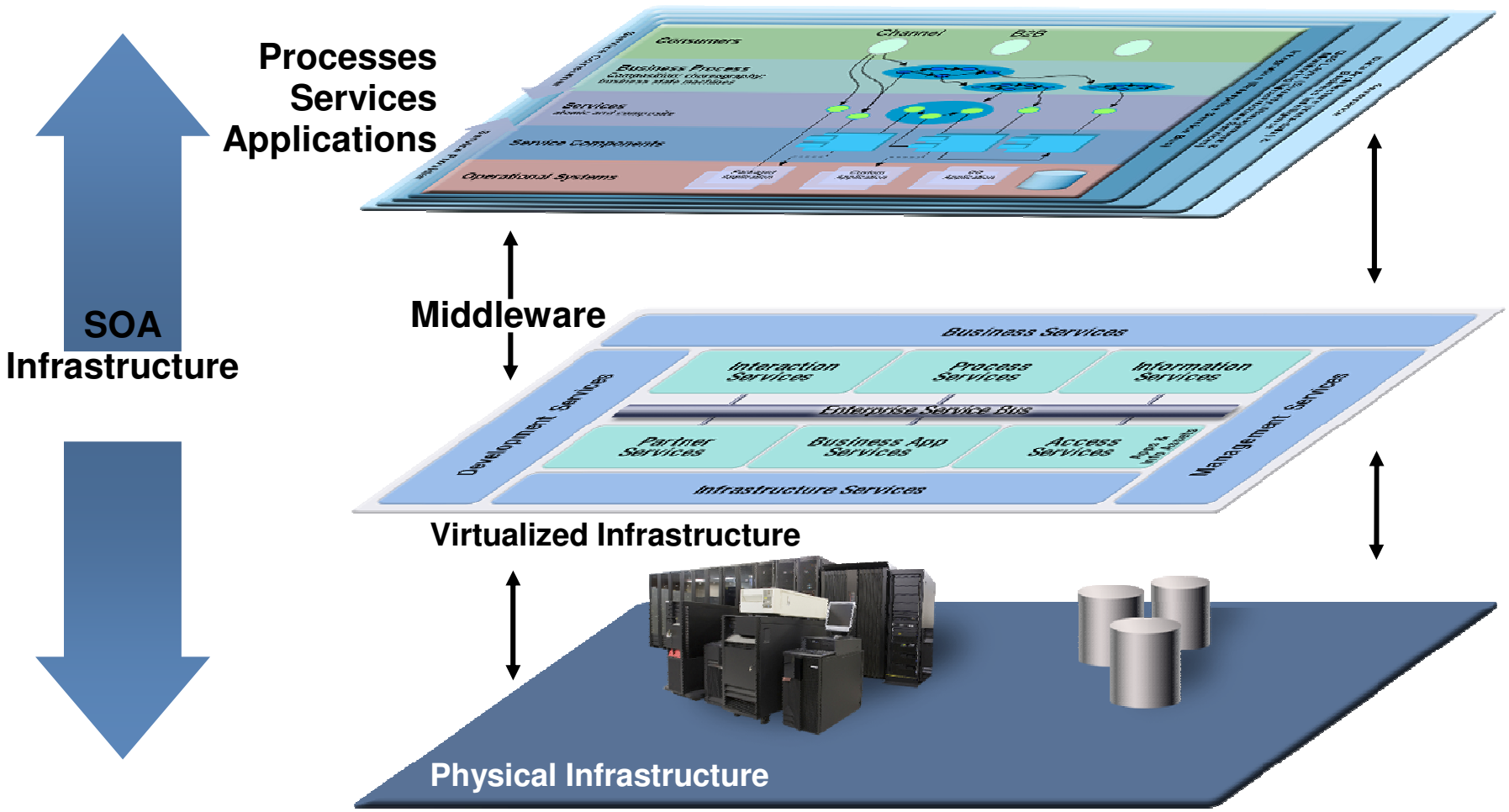
Tivoli software

@business on demand.

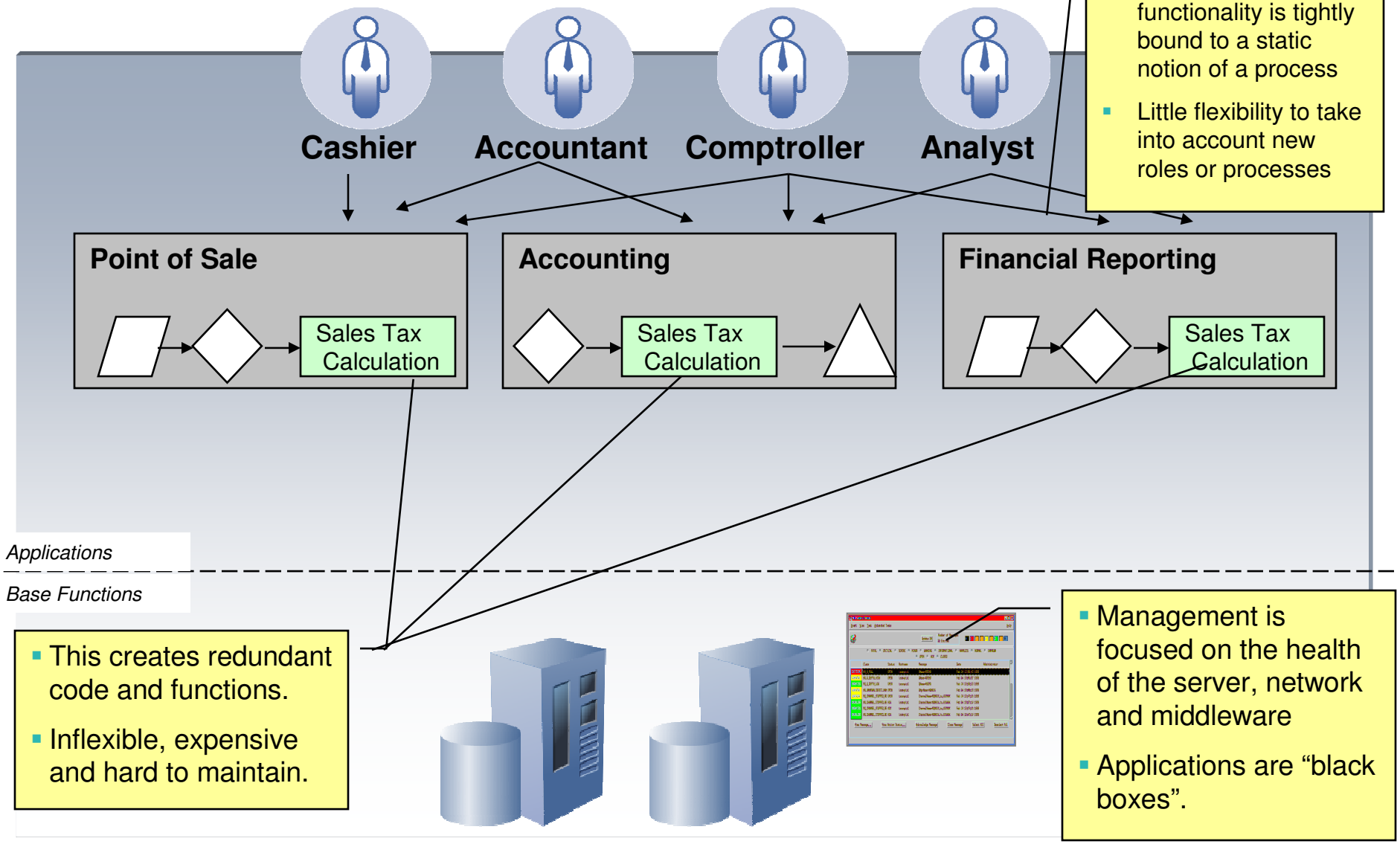
Agenda

- SOA Management Challenge
- IBM Tivoli Composite Application Manager for SOA
  - Service problem identification & resolution
  - Service Management Automation
  - Heterogeneous SOA Platform Support
  - Integrated Console
  - Life-cycle Management
- Summary

SOA and Layers of Abstraction



An Example…

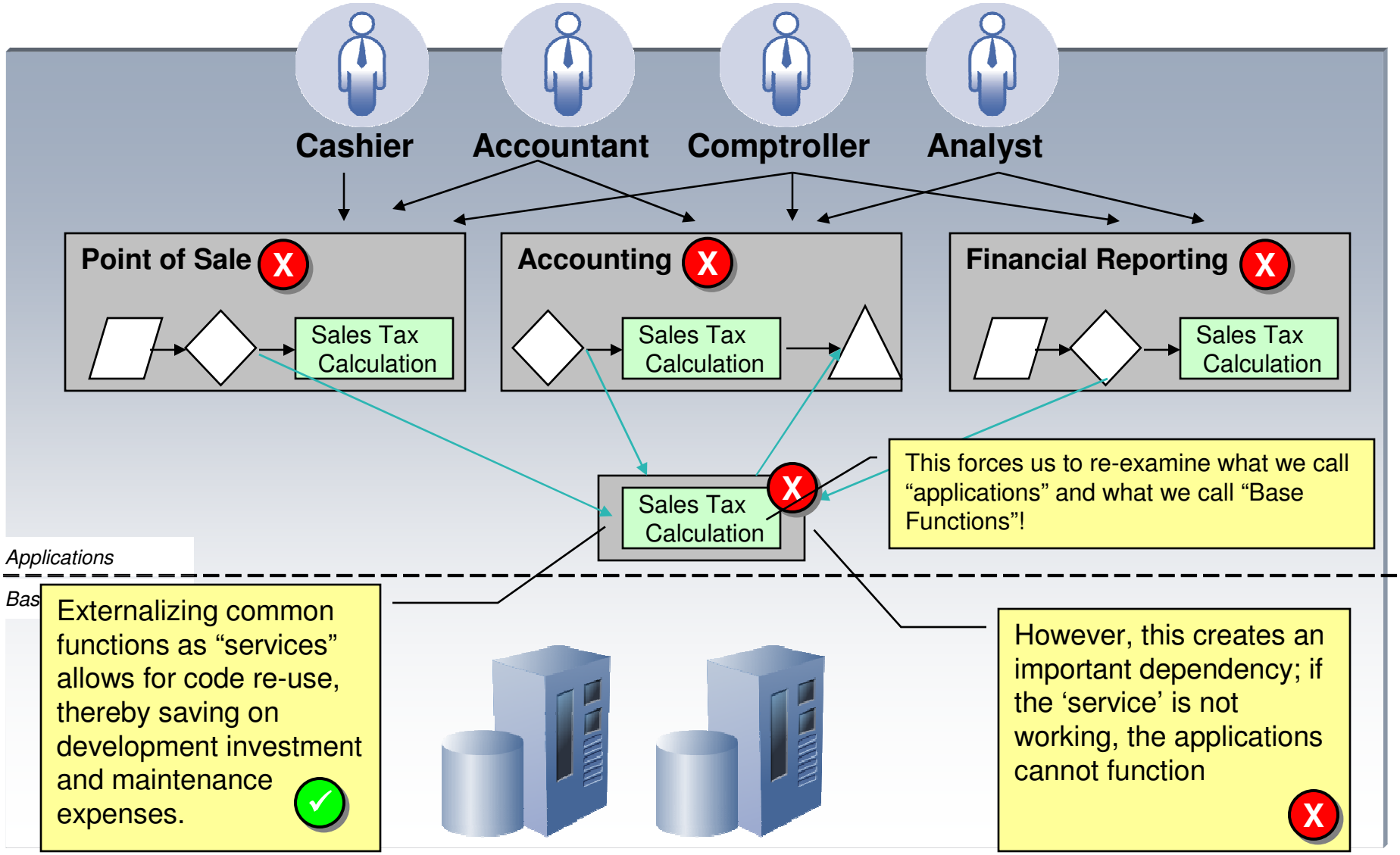


- Application functionality is tightly bound to a static notion of a process
- Little flexibility to take into account new roles or processes

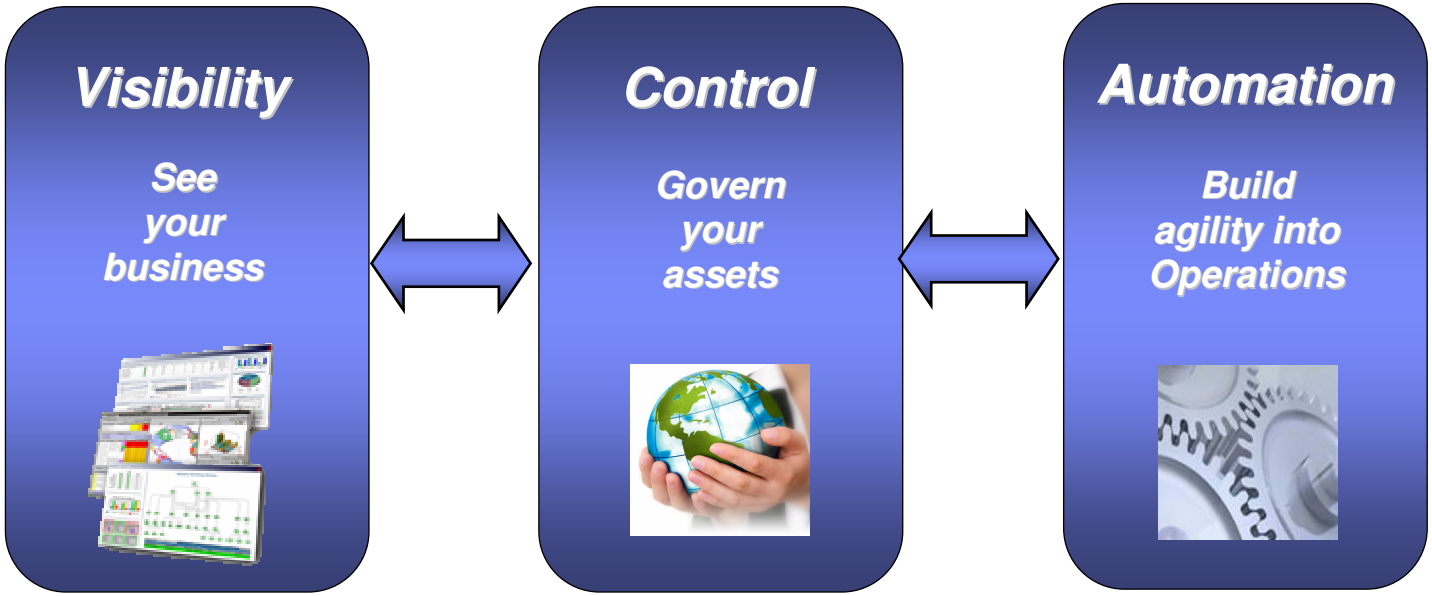
- This creates redundant code and functions.
- Inflexible, expensive and hard to maintain.

- Management is focused on the health of the server, network and middleware
- Applications are “black boxes”.

The New World: Composable Services



IBM Service Management (ISM)
An Integrated Approach to Getting Business Results



Only IBM delivers integrated visibility across Business & IT Audiences.

e.g. How is my business critical services doing?

Only IBM delivers integrated control across Business & IT Assets.

e.g. Control your service environment such as service providers, servers, infrastructure

Only IBM delivers integrated automation across Business & IT Operations.

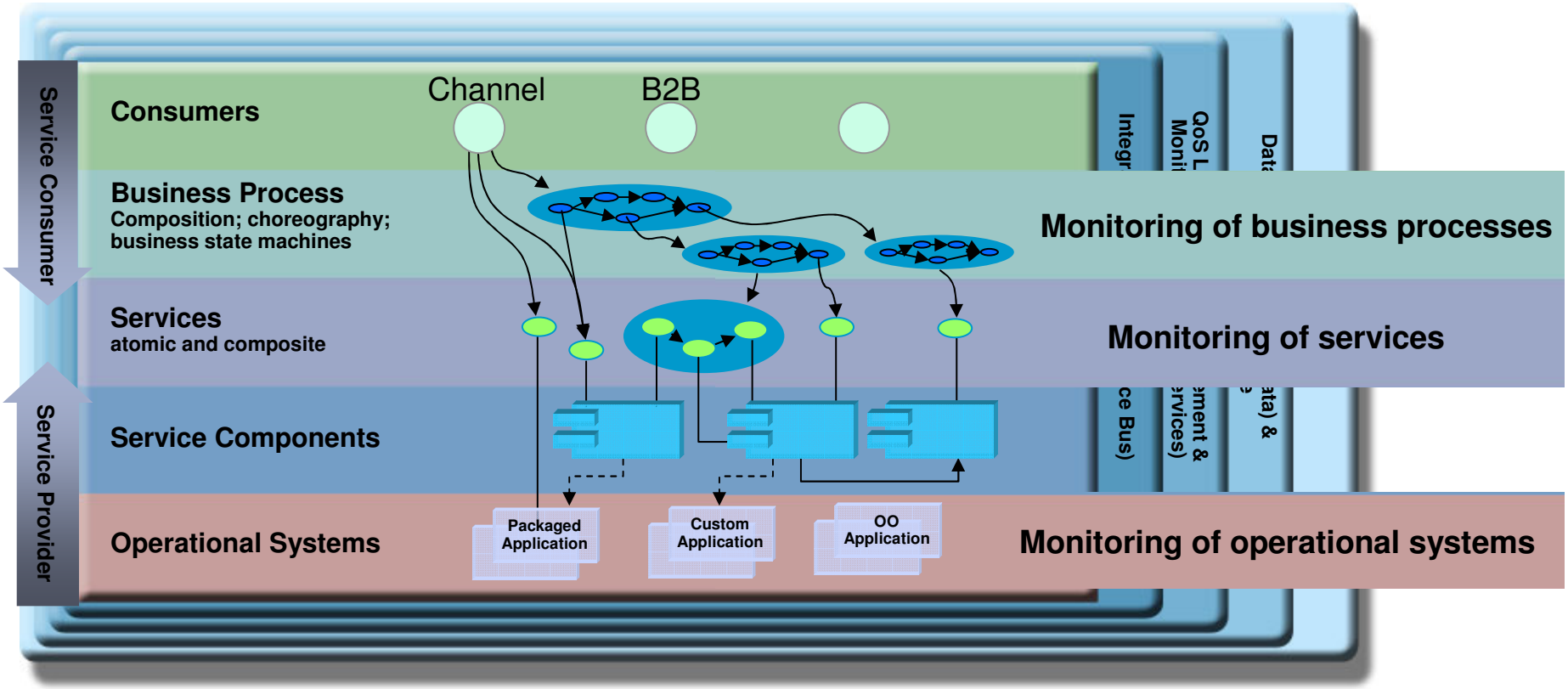
e.g. Monitor service environment, performance and take proactive actions

ISM - A Comprehensive Solution

- ISM is the industry's most comprehensive management solution, addressing all the critical needs of multiple audiences

- Service Delivery & Process Automation
- Service Availability & Performance Mgmt.
- SOA Management
- Security, Risk Management and Compliance
- Storage Management
- Asset and Financial Management
- Service Assurance

The Challenges of Managing SOA

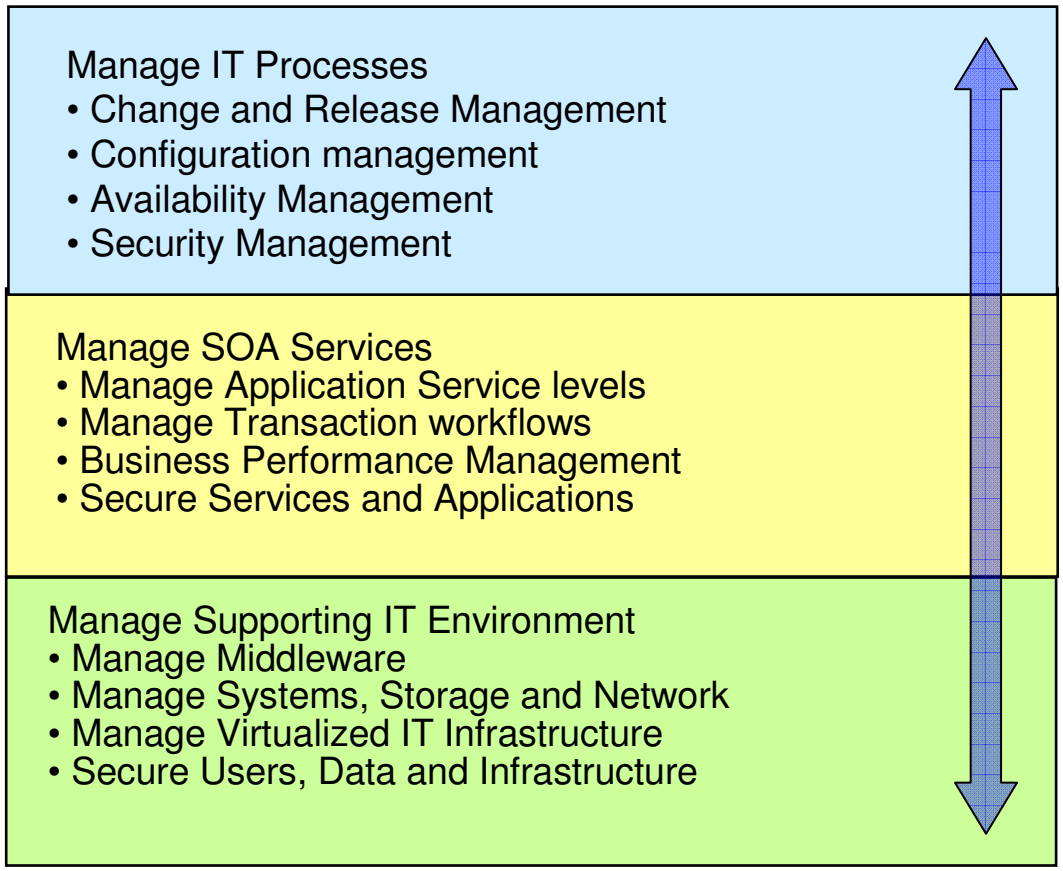


What is Management of SOA?

Common SOA Characteristics

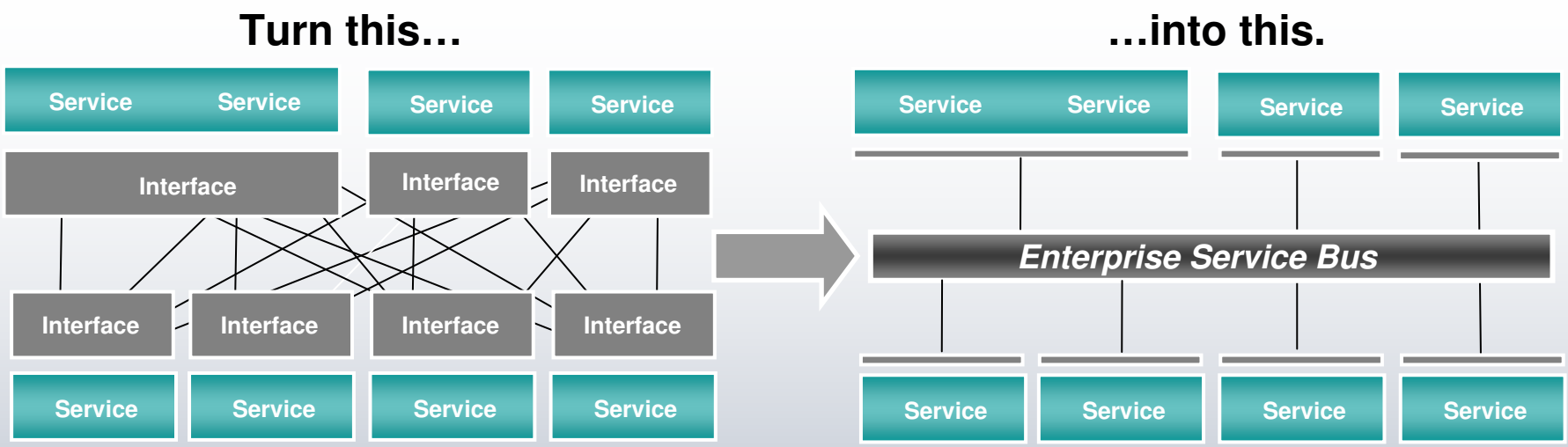
- Applications reused in new dynamic ways
- Services combined from multiple sources
- Rapid deployment
- Services route to any available resource
- Distributed access

IBM Service Management of SOA



SOA Widens the Scope of Management

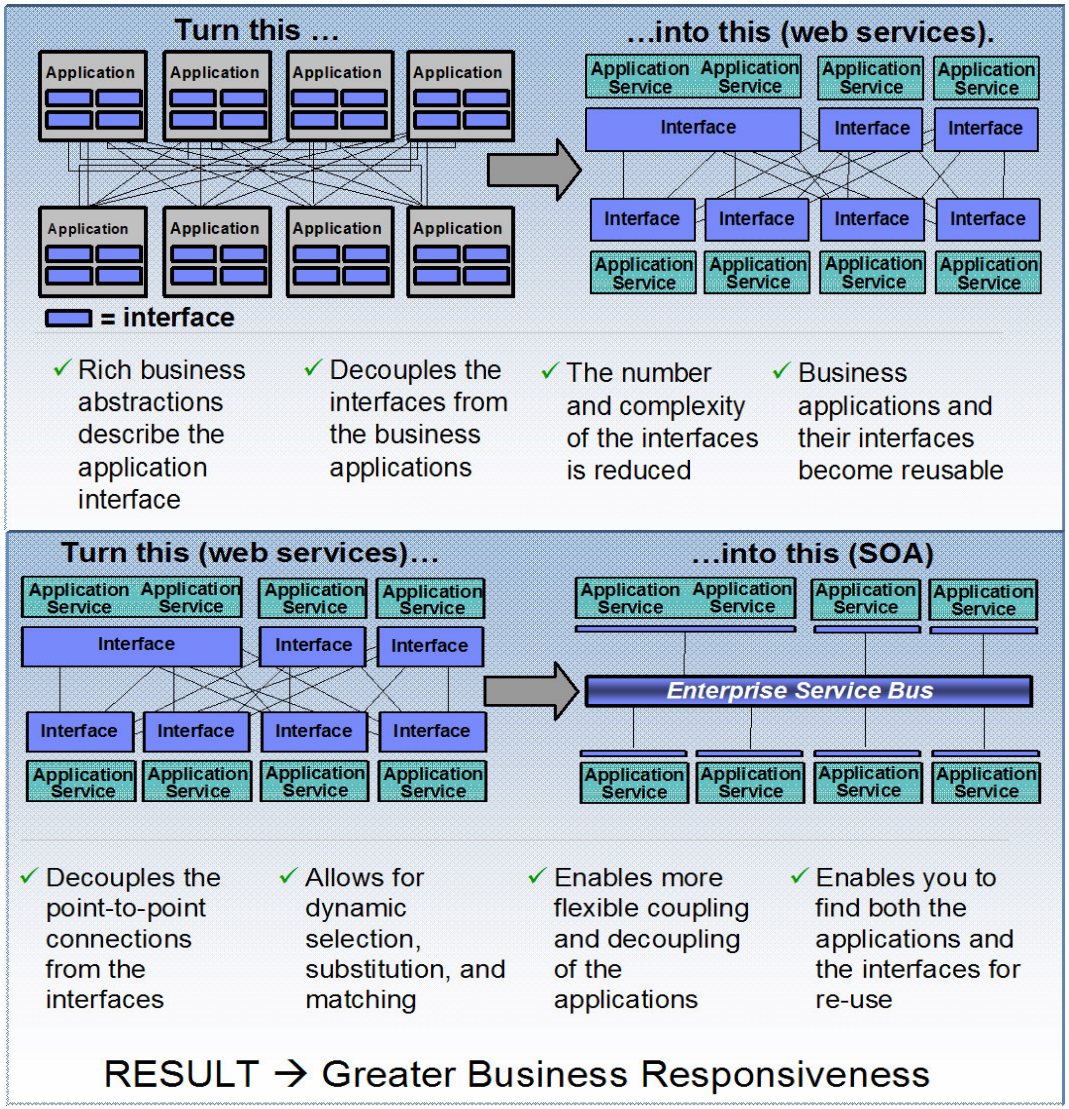
Loose Coupling is Enabled By an "ESB"



- ✓ Decouples the point-to-point connections from the interfaces
- ✓ Allows for dynamic selection, substitution, and matching
- ✓ Enables more flexible coupling and decoupling of the applications
- ✓ Enables you to find both the applications and the interfaces for re-use

Result → Greater Responsiveness

ESB and SOA Management



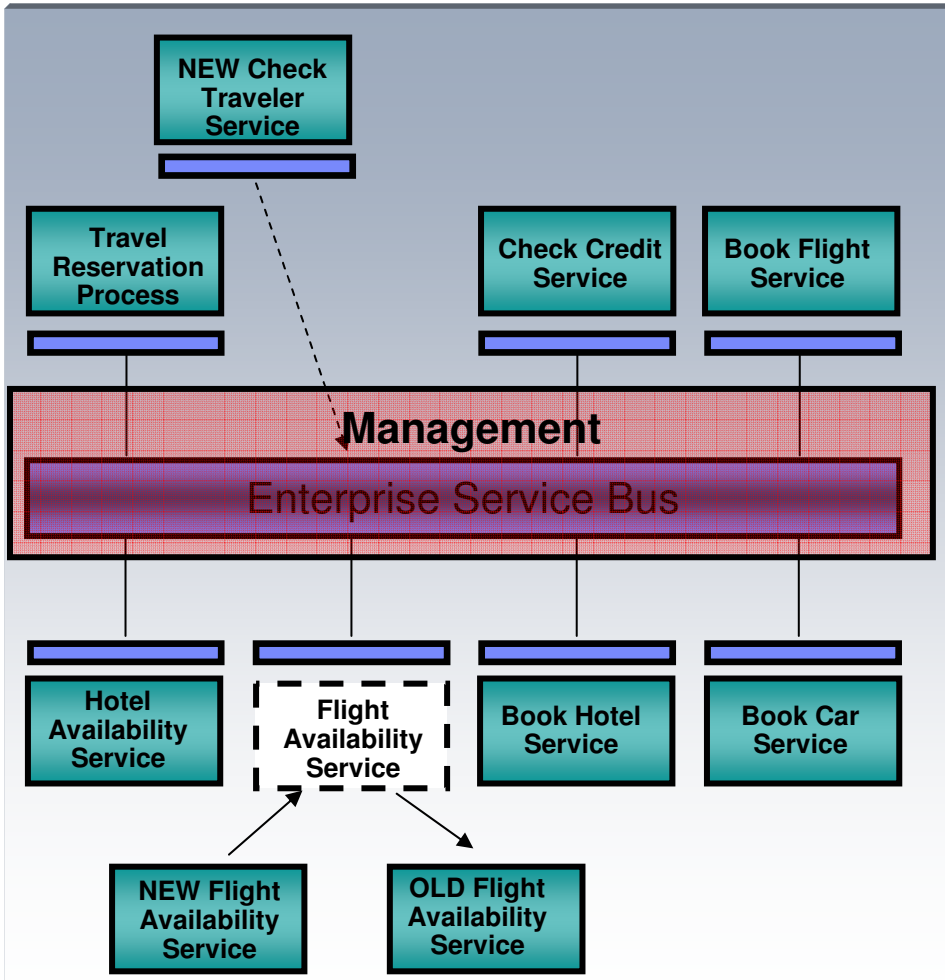
Phase 1: Use Web Services

- This is commonly referred to as JOBWS (just a bunch of web services)
- Many customers are at this stage
- Simple, developer-driven scenarios

Phase 2: Organize and control web services

- Next level of integration strategy
- Involvement of Enterprise Architecture
- More complex scenarios, involving development, architecture, Operations

ESB and SOA Management



Management tools naturally target ESBs as enforcement endpoints:

- **To perform ROUTING of messages based on system capacity, Quality of Service, and SLAs**
- **Leverage CONVERSION and TRANSFORMATION capabilities to comply with policy**
- **Centralize HANDLING of IT events related to Services**

Service Oriented Application Problems and Challenges

- **Typical application management problems**
  - My users are complaining – Response / Performance
  - My critical application is down - Availability
  - Spike in number of users - Capacity / Resource Usage
  - Slow or Hung application – Need for Diagnostic Data – Real Time and Historical
  - Increased involvement of SME/Development affect new product development? – Problem Monitoring and Automation
- **New application environment - New challenges**
  - I want to extend and leverage SOA – SOA Management Challenges
- **Application life cycle**
  - Lack of IT Operations and Development communications – Bridging IT Operations and Development
  - I want more control on how my application runs in production – Build for manageability

What to monitor in an application environment

- Response Times
  - End user and transaction times
  - Service response in an SOA
- Resources that affect performance
  - System resources
  - Application environment resources
  - Application resources
- On demand collection of diagnostic data when required
- Historical monitoring of data collection for trend analysis and reporting
- Actionable metrics for creating performance and availability management automation

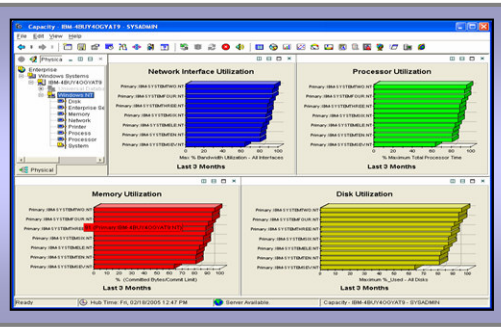
What is ITCAM?

- ITCAM – **IBM Tivoli Composite Application Manager** family of products helps monitor and manage applications in various application environments on a wide variety of platforms – from distributed to zOS.

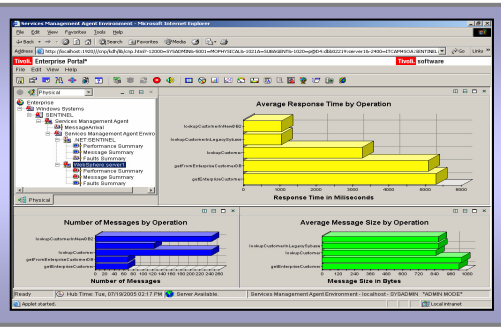
- ITCAM suite consists of
  - ITCAM for Response Time (RT) and Response Time Tracking (RTT)
  - ITCAM for SOA
  - ITCAM for WebSphere / J2EE / Web Resources
  - OMEGAMON XE for Messaging

- They integrate seamlessly with the enterprise monitoring infrastructure - IBM Tivoli Monitoring (ITM) / OMEGAMON / Tivoli Enterprise Portal (TEP) which provides a single view across all enterprise managed systems and application environment

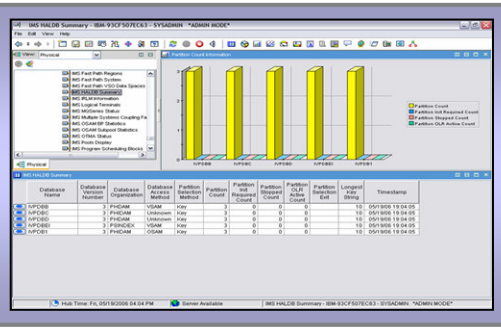
ITCAM – Application Management Family



ITM



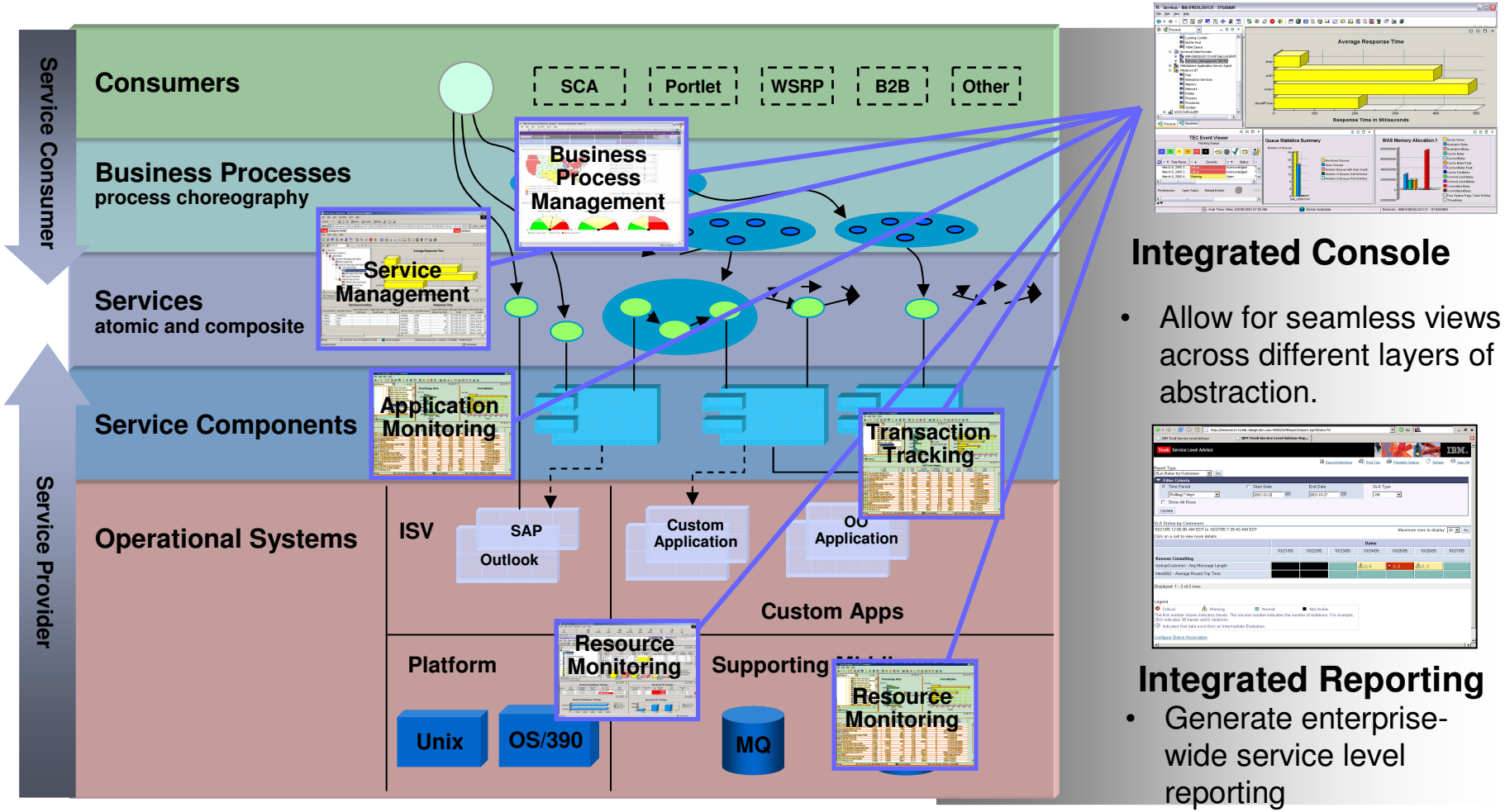
ITCAM



OMEGAMON

Tivoli Enterprise Portal (TEP)

A Complete View Of SOA Management



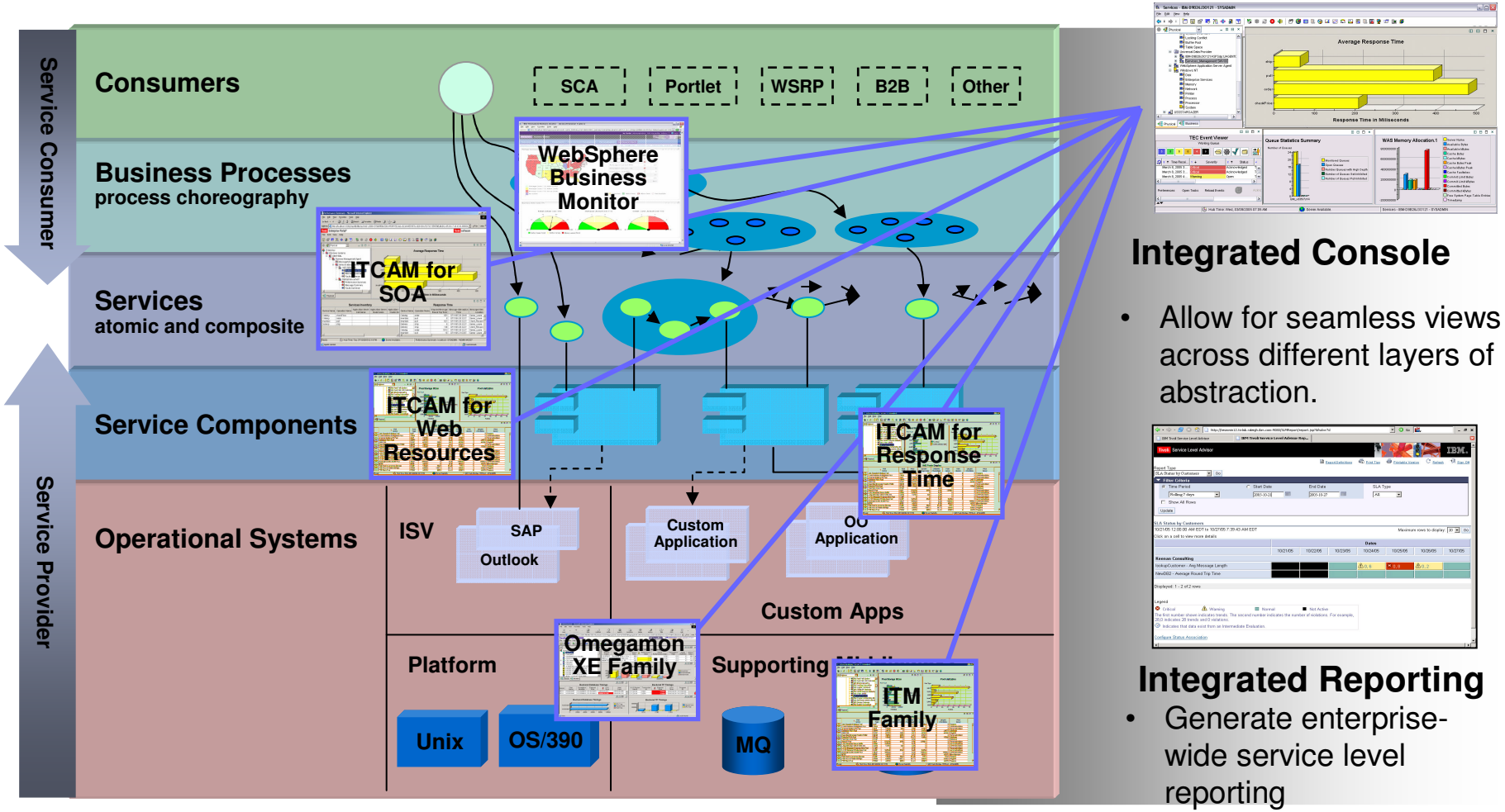
Integrated Console

- Allow for seamless views across different layers of abstraction.

Integrated Reporting

- Generate enterprise-wide service level reporting

A Complete View Of SOA Management



Integrated Console

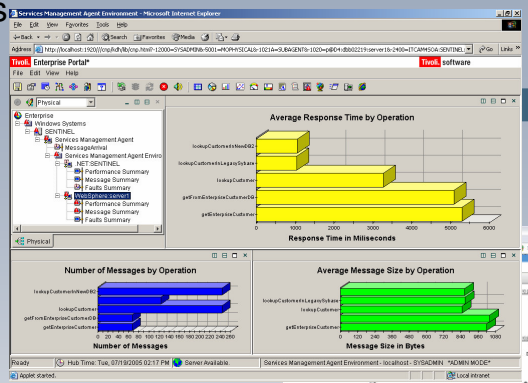
- Allow for seamless views across different layers of abstraction.

Integrated Reporting

- Generate enterprise-wide service level reporting

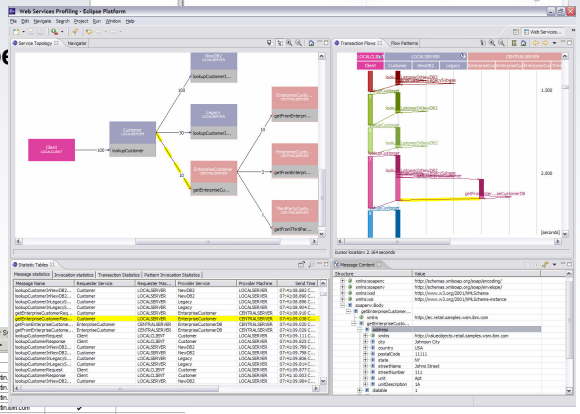
IBM Tivoli Composite Application Manager for SOA

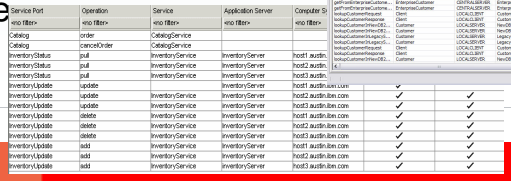
- **Service problem identification & resolution**
  - Content-rich views, topology and cross-workspace linkages enable drill-down from services to application components and IT resources to identify the source of bottleneck or failure
- **Service Management Automation**
  - Built-in and extensible alerts, situations, workflows enable powerful automation scenarios
  - Managed mediation primitives for WebSphere ESB enable control of services
- **Heterogeneous SOA Platform Support**
  - SOA Platform support covers IBM WebSphere Application Server, WebSphere ESB, WebSphere Process Server, WebSphere DataPower, WebSphere Message Broker, Microsoft .NET, JBOSS, CICS, SAP and BEA WebLogic
- **Integrated Console**
  - Service views, alerts and automation included within Tivoli Enterprise Portal, the integration point for ITCAM, OMEGAMON, ITM and TBSM
- **Life-cycle Management**
  - Web Services Navigator provides deep understanding of service flows and relationships
  - WebSphere Service Registry and Repository integration supports SOA Governance
- **Support for ISM strategy**
  - Discovery Library Adapters add discovered Service information to CCMDB
  - Additional DLAs provided for BPEL and WSRR



IT Operations

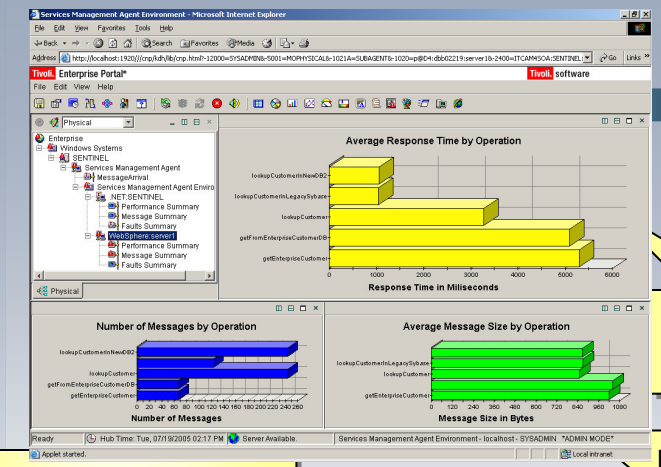
Web Services Expe





Service problem identification and resolution

- To ensure service levels conform to agreed upon specifications, you need:
  - Views and analysis of Web service interactions for IT Operations to quickly identify source of errors, and take corrective action through situations, workflow and mediations
  - Detailed views of operational SOAP/XML message content, flow patterns and topology for Web services experts and support teams
  - Highly performing and flexible enforcement points



IT Operations

"Don't give me another console"

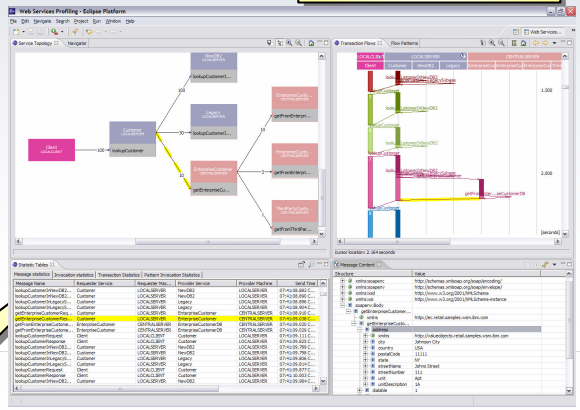
Response Time

Message Count

Message Size

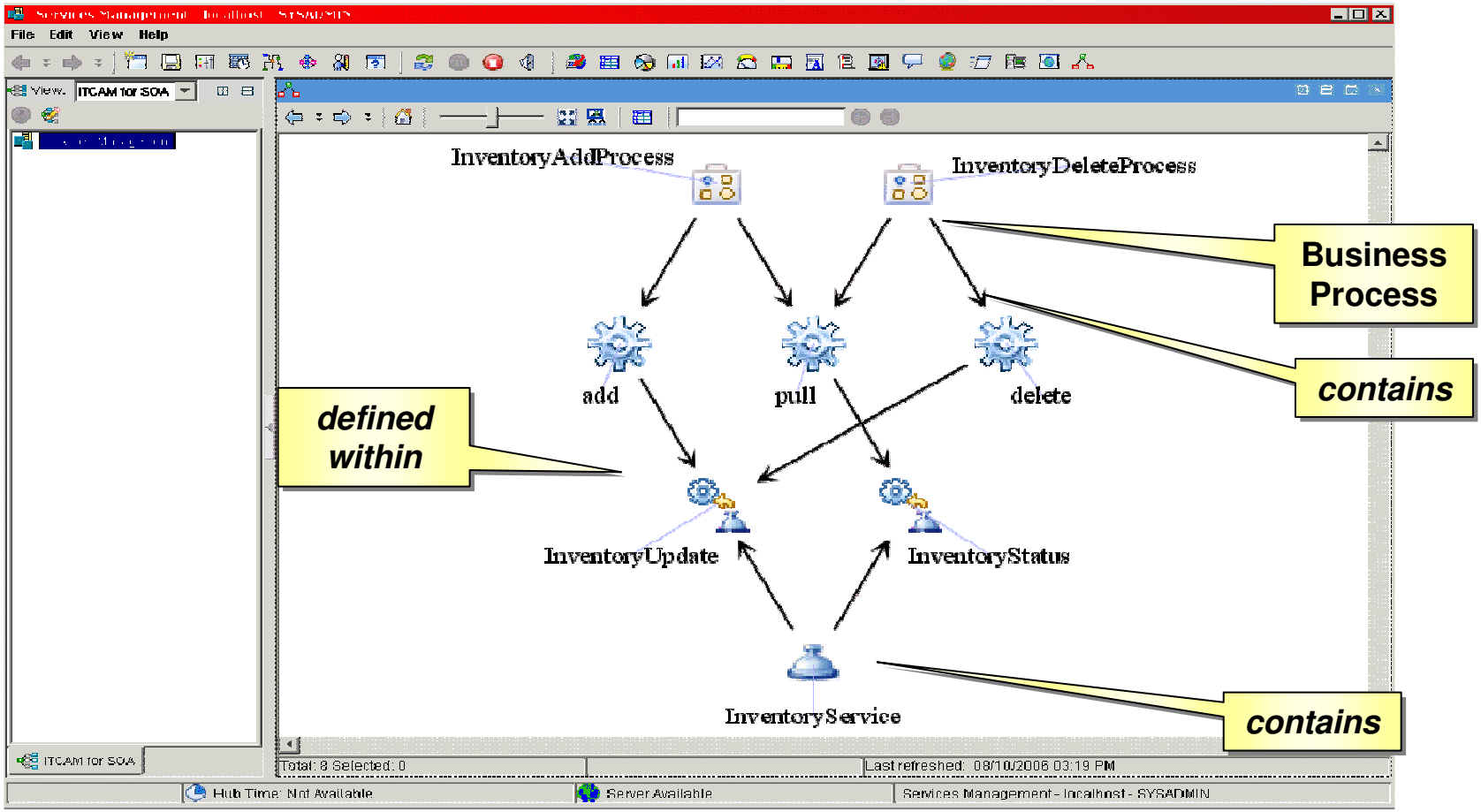
Web Services Expert

"Show me the service & flow details!"

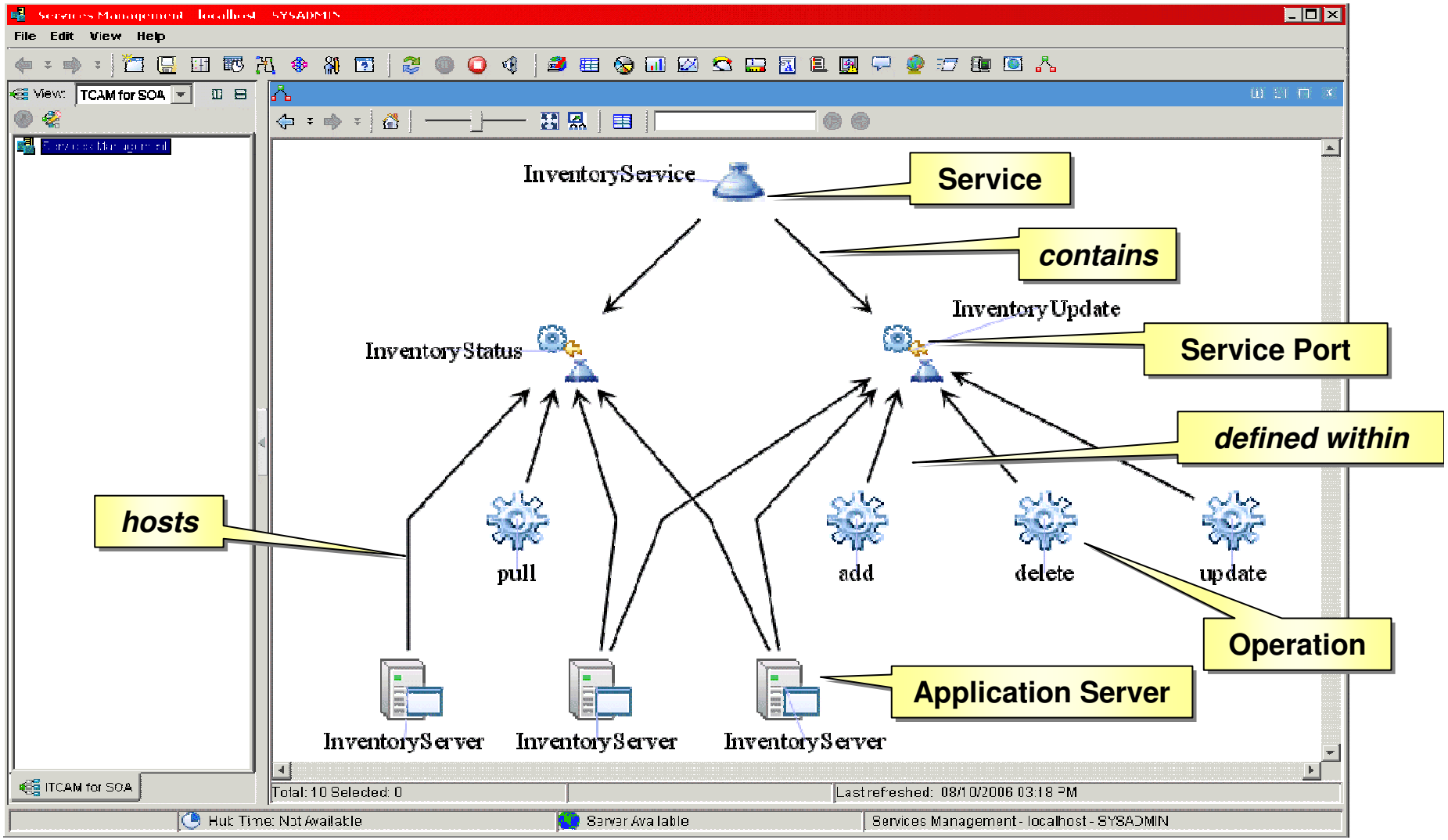


Web Services Navigator

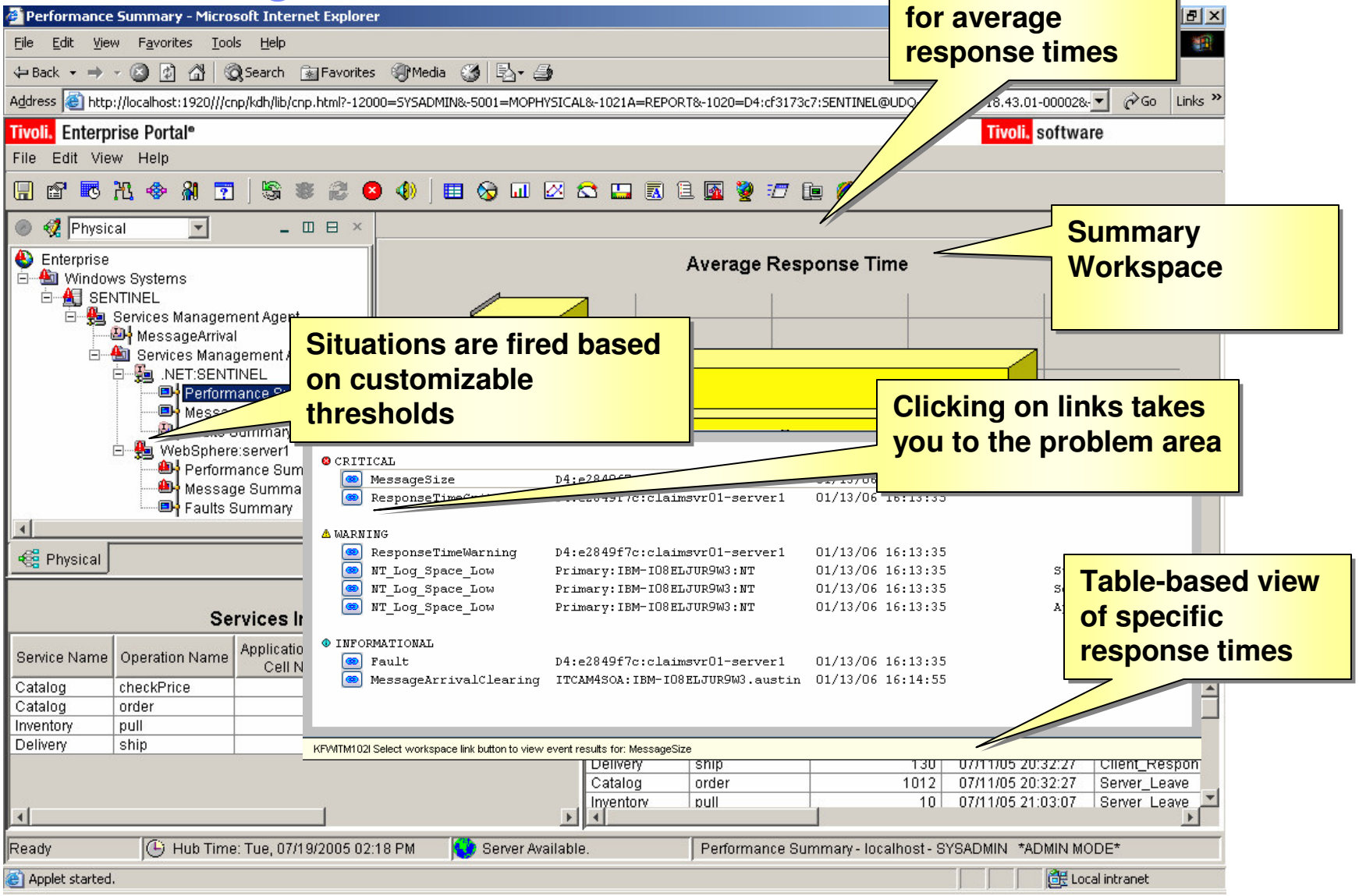
Business Process Topology View



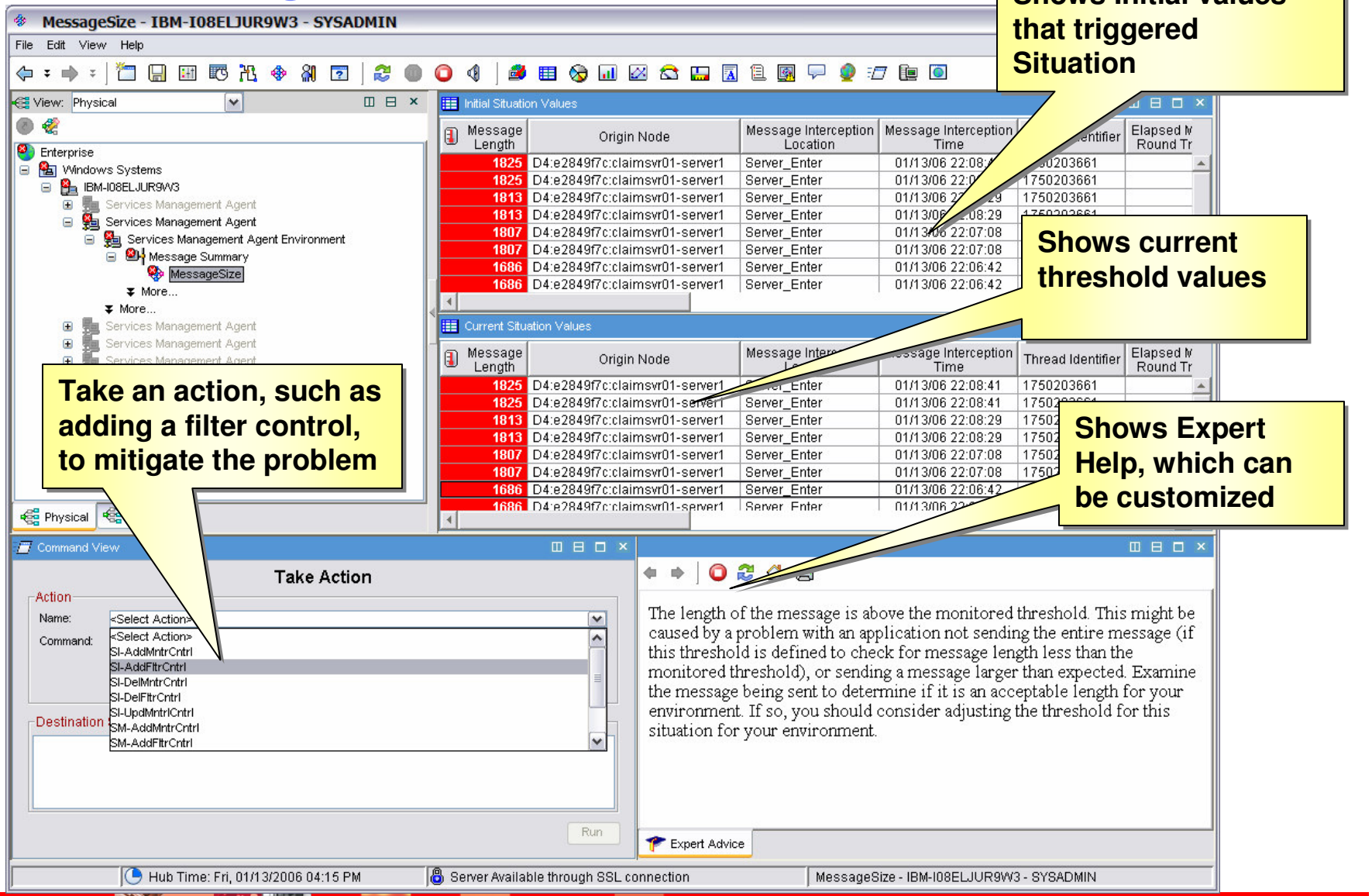
Service Details Topology View



Service Management Automation

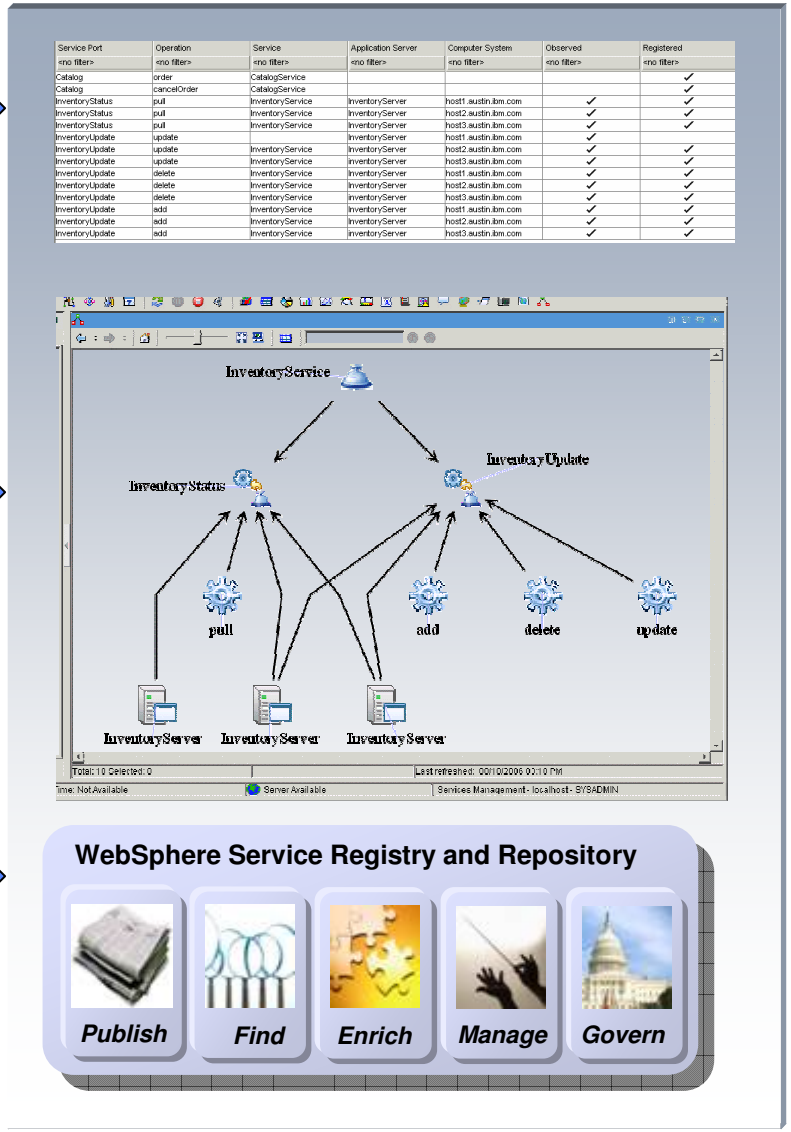


Service Management Automation



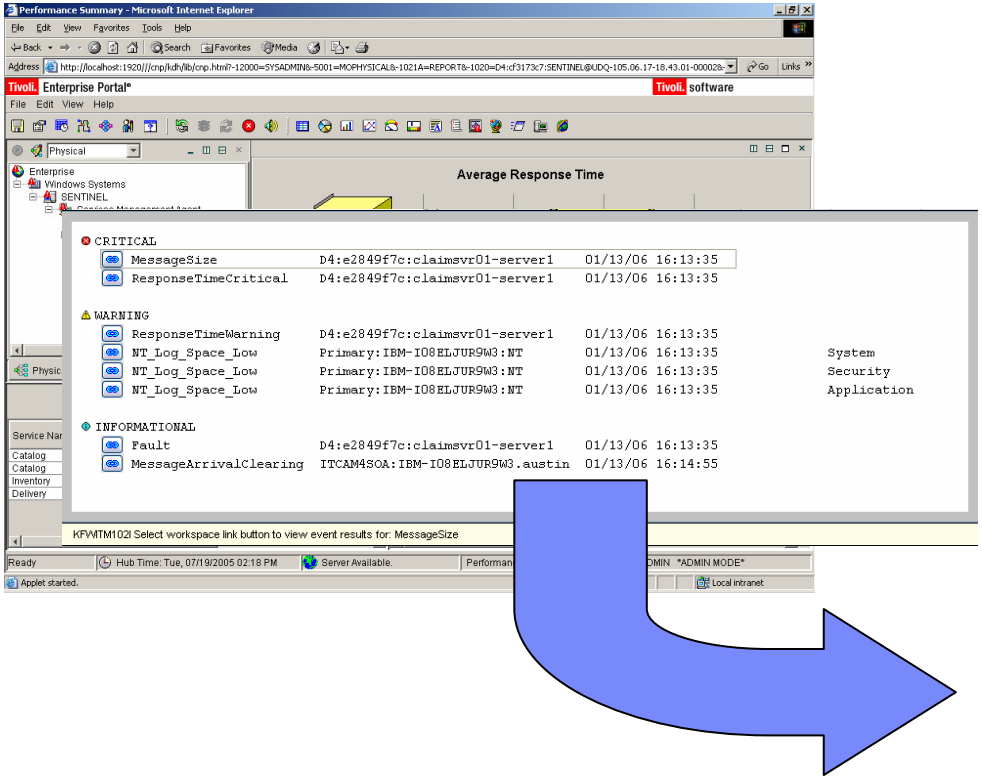
WebSphere Service Registry and Repository Integration

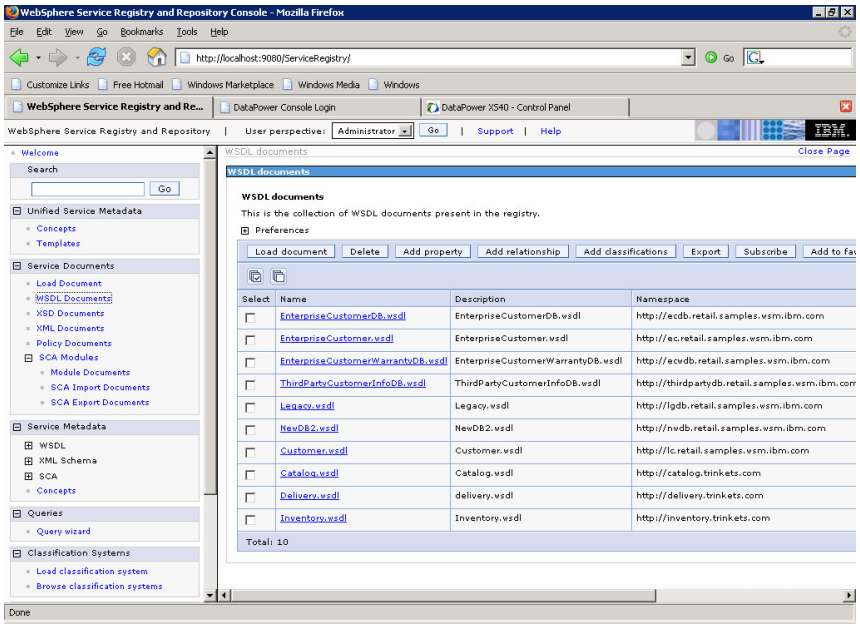
- Reconciliation of services registered in WSRR with those monitored in target systems by ITCAM for SOA
- Topology views show relationships between service operations and BPEL business processes for impact analysis
- Forwards status information to WSRR to allow selection of services based on performance and other metrics



Forwarding Service Status to WSRR

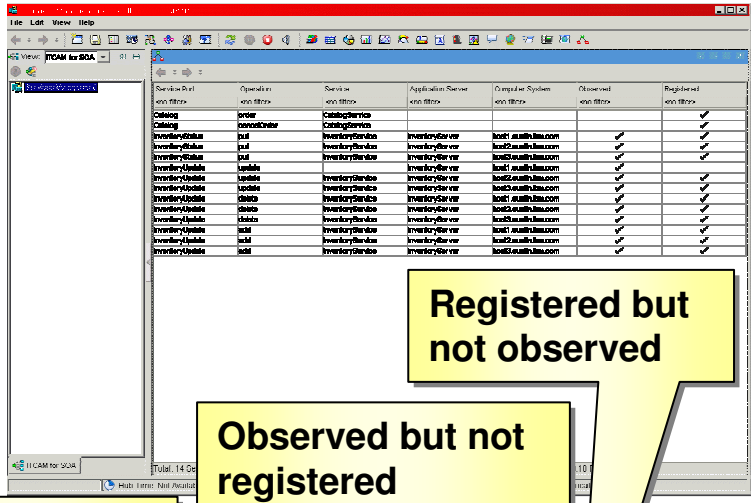
- ITCAM for SOA forwards service status to WSRR
  - Customizable using TEP situations driven by Response time and Availability
  - Integrated event routing and support for TEC or OMNIbus
- Enables manual service composition based on ‘best available’ service





Compare Observed with WSRR-Registered Services

- ITCAM for SOA compares services it observes with those registered in WSRR
- Services observed but not registered
  - Why? Services not registered might be implemented again!
- Services registered but not observed
  - Why not? Common services not being utilized might imply poor decision making
- Services registered and observed
  - Good – helps understand common service reuse
- Understanding discrepancies enables better service governance



Service Port	Operation	Service	Application Server	Compute	Ob	Registe
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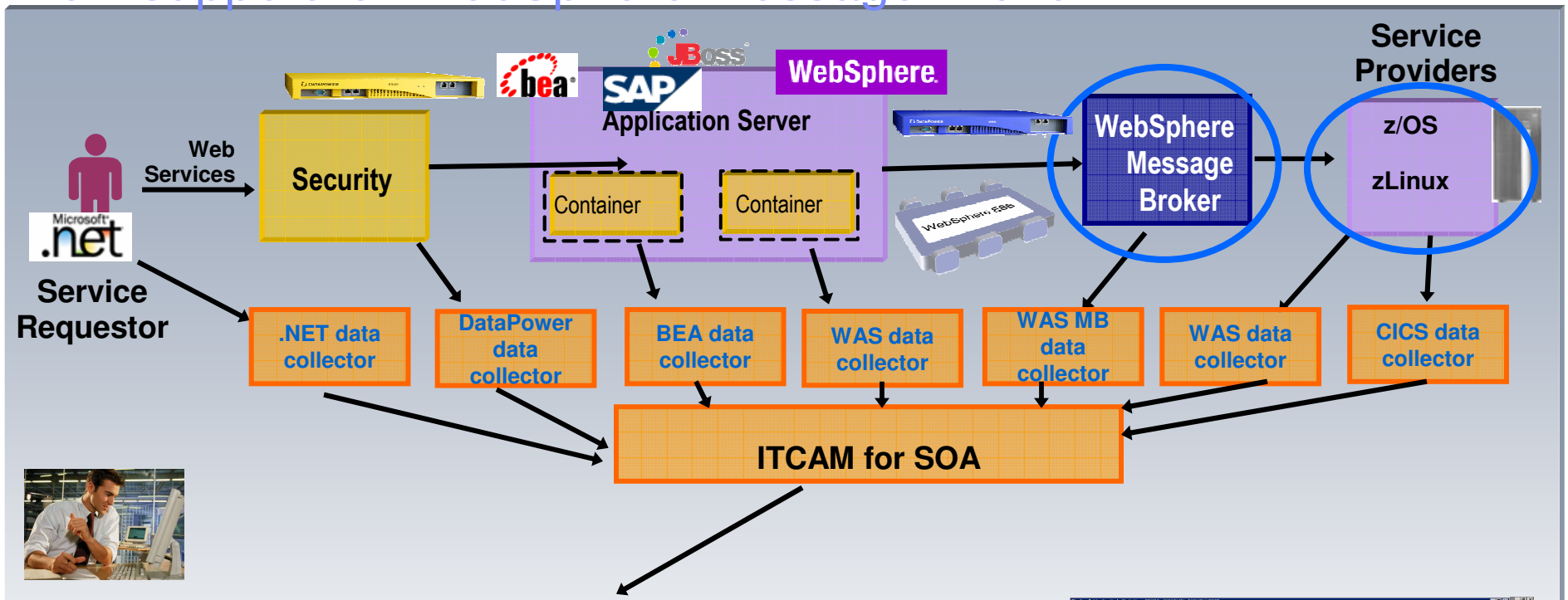
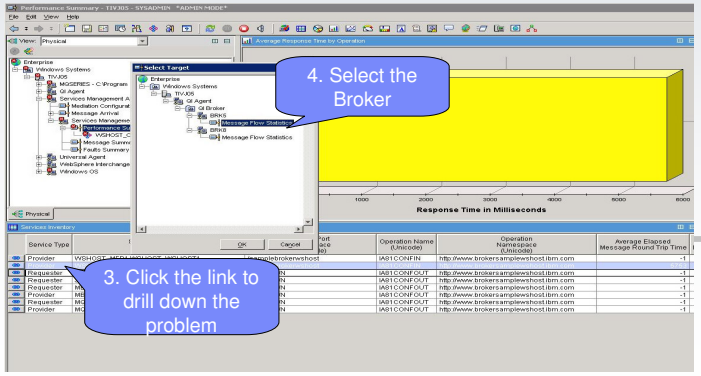
Catalog	order	CatalogService				✓
Catalog	cancelOrder	CatalogService				✓
InventoryStatus	pull	InventoryService	InventoryServer	host1.austin.ibm	✓	✓
InventoryStatus	pull	InventoryService	InventoryServer	host2.austin.ibm	✓	✓
InventoryStatus	pull	InventoryService	InventoryServer	host3.austin.ibm.c	✓	✓
InventoryUpdate	update		InventoryServer	host1.austin.ibm.co	✓	
InventoryUpdate	update	InventoryService	InventoryServer	host2.austin.ibm.com	✓	✓
InventoryUpdate	update	InventoryService	inventoryServer	host3.austin.ibm.com	✓	✓
InventoryUpdate	delete	InventoryService	InventoryServer	host1.austin.ibm.com	✓	✓
InventoryUpdate	delete	InventoryService	InventoryServer	host2.austin.ibm.com	✓	✓
InventoryUpdate	delete	InventoryService	inventoryServer	host3.austin.ibm.com	✓	✓
InventoryUpdate	add	InventoryService	InventoryServer	host1.austin.ibm.com	✓	✓
InventoryUpdate	add	InventoryService	InventoryServer	host2.austin.ibm.com	✓	✓
InventoryUpdate	add	InventoryService	inventoryServer	host3.austin.ibm.com	✓	✓

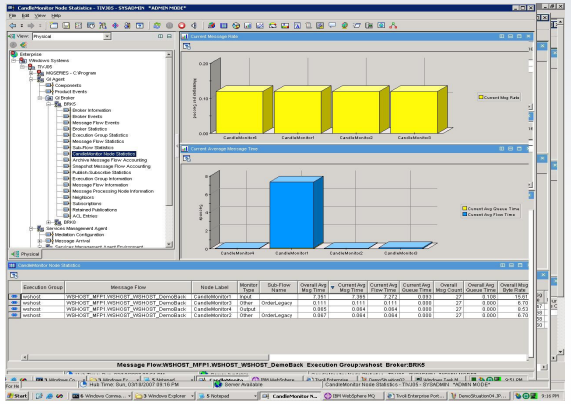
ITCAM for SOA support includes zSeries - new support for WebSphere Message Broker





ITCAM for SOA

- Find and fix the problem quickly
- Monitor Web services inside WS Msg. Broker
- Launch in context from ITCAM for SOA to OMEGAMON XE for Messaging

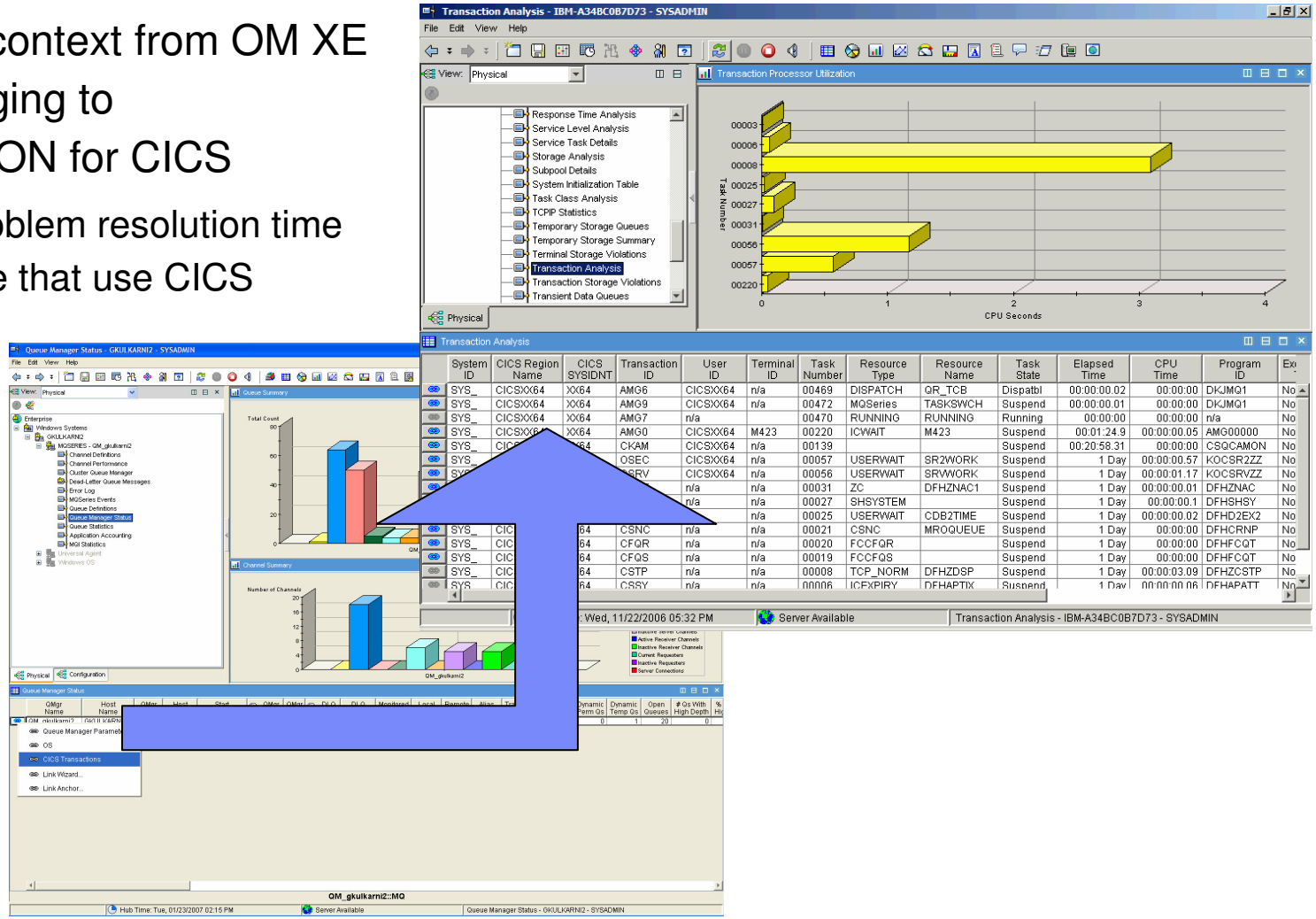


OMEGAMON XE for Messaging

Better Integration with OMEGAMON

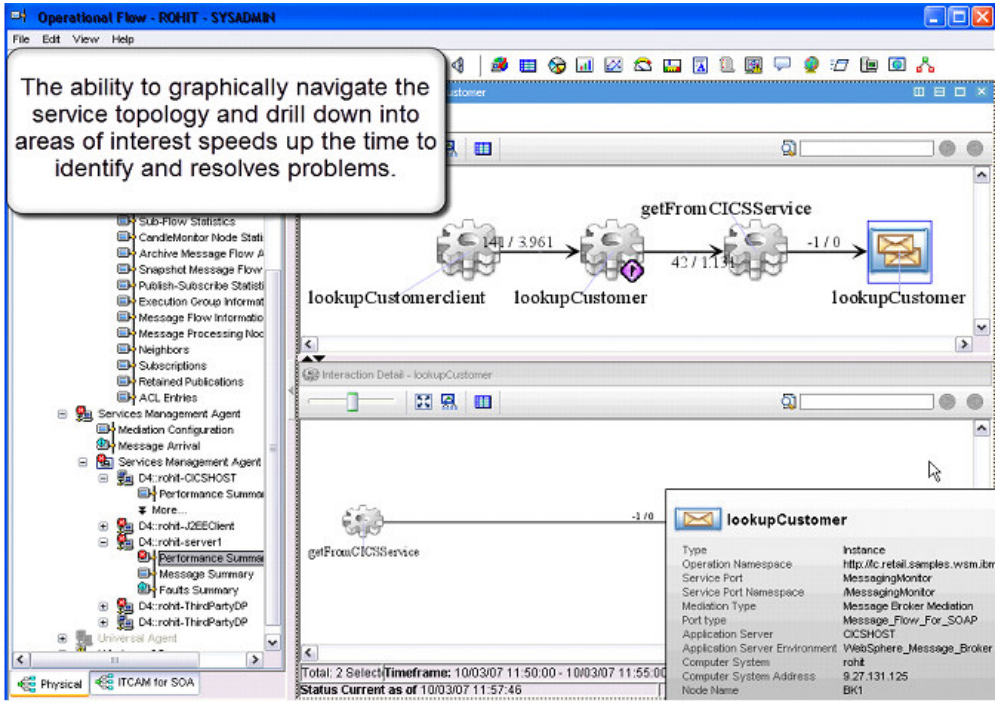
Launch in context from OM XE for Messaging to OMEGAMON for CICS

- Improve problem resolution time for message that use CICS

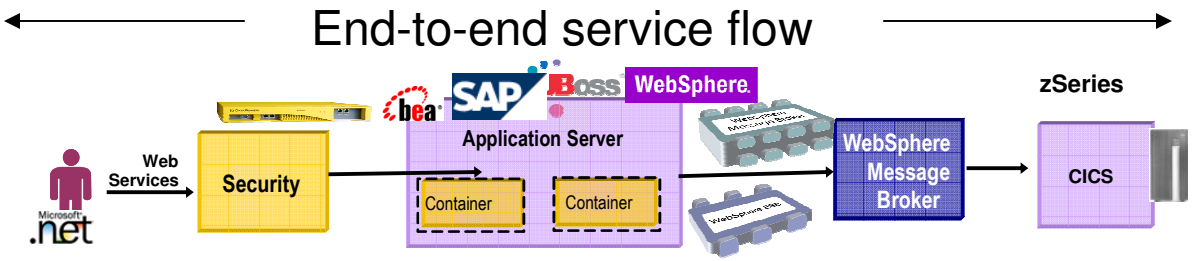


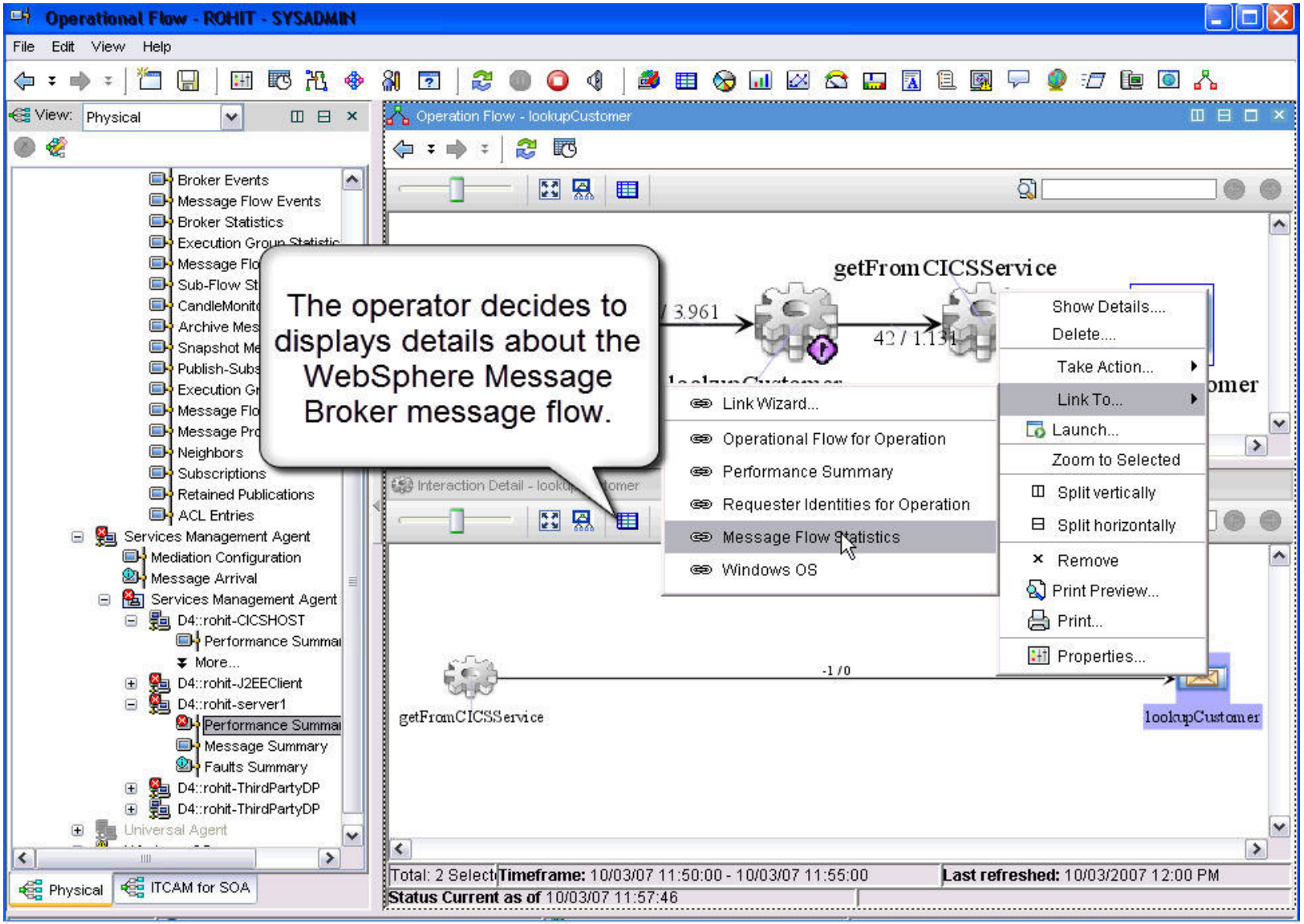
Visibility – See services flows

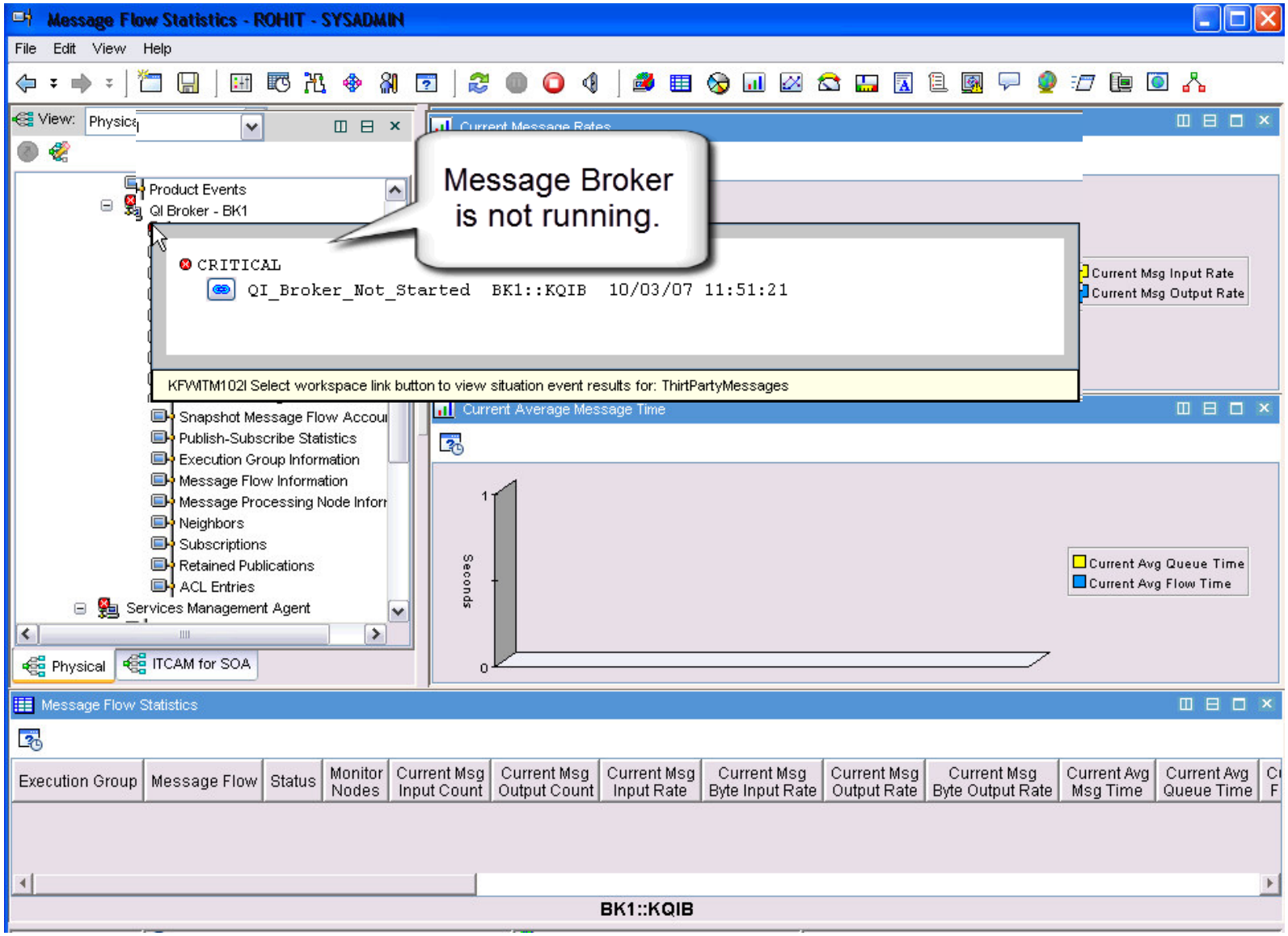
✓Understand where services are flowing so problems can be quickly identified



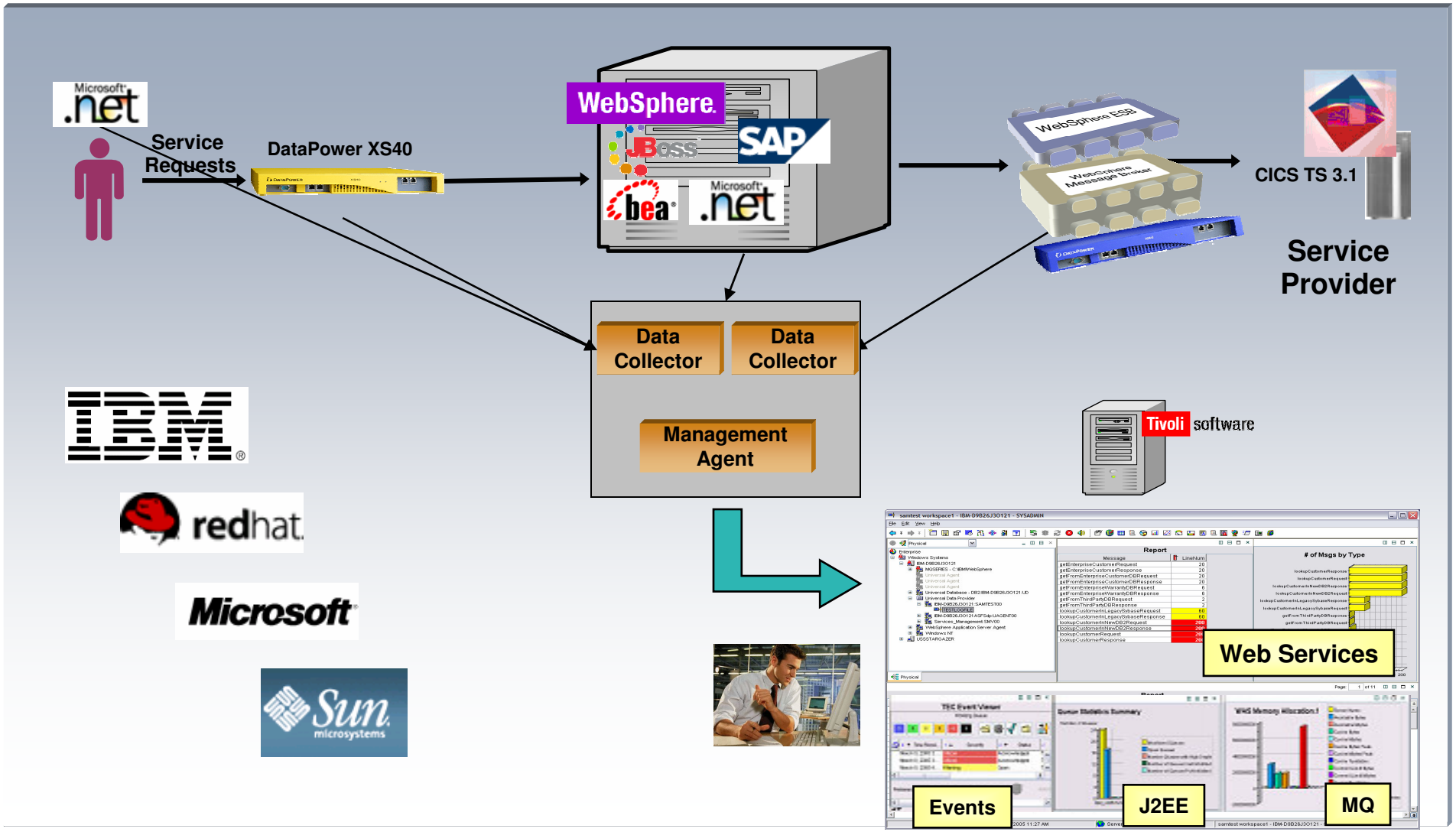
Service topology display makes it easy to see end to end flows




Operational Flow - ROHIT - SYSADMIN
File Edit View Help
View: Physical
Operation Flow - lookupCustomer
The operator decides to displays details about the WebSphere Message Broker message flow.
getFromCICSService
3.961
42 / 1.131
Show Details....
Delete....
Take Action...
Link To...
Launch...
Zoom to Selected
Split vertically
Split horizontally
Remove
Print Preview...
Print...
Properties...
Link Wizard...
Operational Flow for Operation
Performance Summary
Requester Identities for Operation
Message Flow Statistics
Windows OS
Broker Events
Message Flow Events
Broker Statistics
Neighbors
Subscriptions
Retained Publications
ACL Entries
Services Management Agent
Mediation Configuration
Message Arrival
D4::rohit-CICSHOST
More...
D4::rohit-J2EEClient
D4::rohit-server1
Message Summary
Faults Summary
D4::rohit-ThirdPartyDP
Universal Agent
-1 / 0
lookupCustomer
Physical
ITCAM for SOA
Timeframe: 10/03/07 11:50:00 - 10/03/07 11:55:00
Last refreshed: 10/03/2007 12:00 PM
Status Current as of 10/03/07 11:57:46

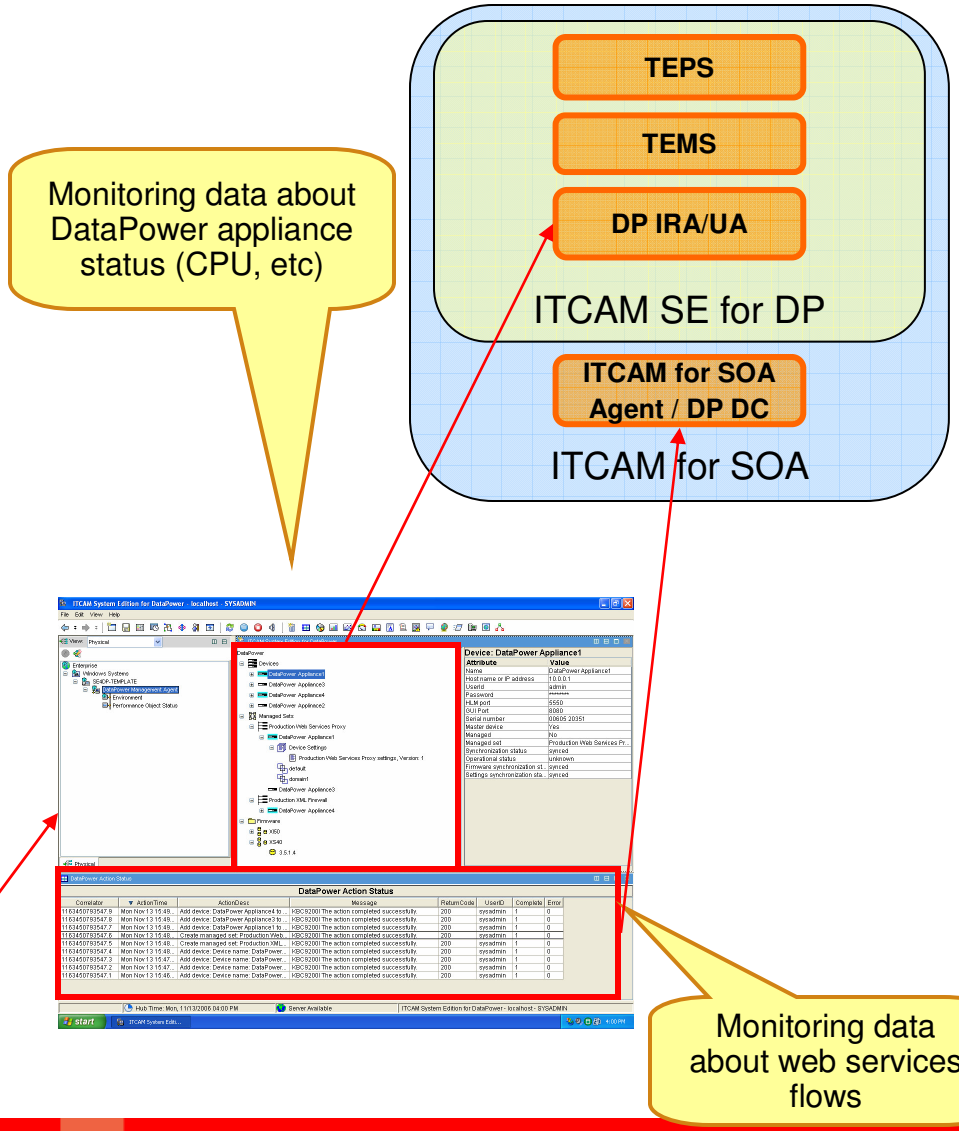

Message Flow Statistics - ROHIT - SYSADMIN
File Edit View Help
View: Physica
Product Events
QI Broker - BK1
Message Broker is not running.
CRITICAL
QI_Broker_Not_Started BK1::KQIB 10/03/07 11:51:21
KFWITM102I Select workspace link button to view situation event results for: ThirtPartyMessages
Snapshot Message Flow Accou
Publish-Subscribe Statistics
Execution Group Information
Message Flow Information
Message Processing Node Inforr
Neighbors
Subscriptions
Retained Publications
ACL Entries
Services Management Agent
Physical
ITCAM for SOA
Current Message Rates
Current Msg Input Rate
Current Msg Output Rate
Current Average Message Time
Seconds
1
0
Current Avg Queue Time
Current Avg Flow Time
Message Flow Statistics
Execution Group
Message Flow
Status
Monitor Nodes
Current Msg Input Count
Current Msg Output Count
Current Msg Input Rate
Current Msg Byte Input Rate
Current Msg Output Rate
Current Msg Byte Output Rate
Current Avg Msg Time
Current Avg Queue Time
BK1::KQIB

Heterogeneous SOA platform support



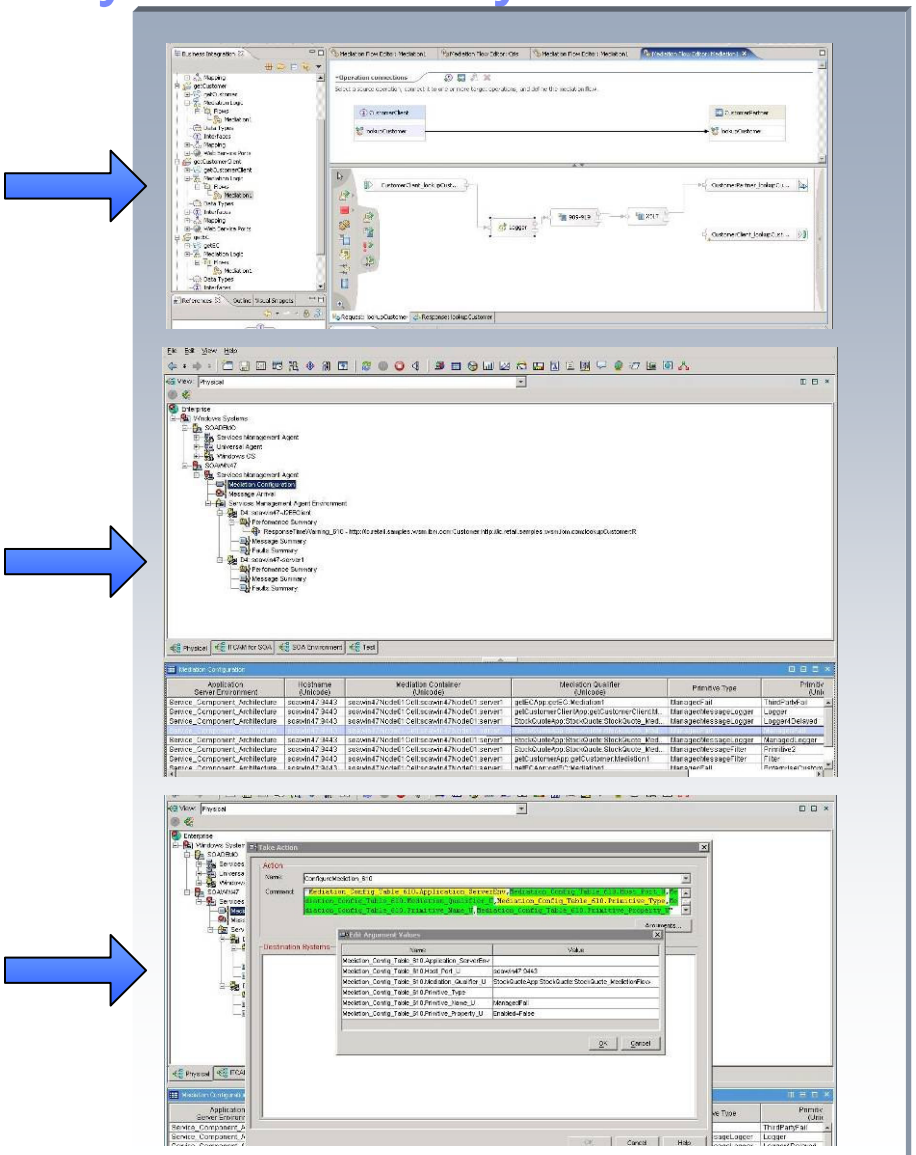
Managing WebSphere DataPower SOA Appliances

- DataPower SOA Appliances
  - Purpose-built, easy-to-deploy network devices that simplify, help secure, and accelerate Web services deployments
- Multi-box management solution required to simplify management
- *ITCAM System Edition for WebSphere DataPower*
  - Manages groups of DataPower devices
  - Integrates with TEP and TMS
  - Included with DataPower appliances
- ITCAM SE monitors and manages DataPower device
- ITCAM for SOA monitors and manages service metrics, etc.
- Need both to manage complete environment

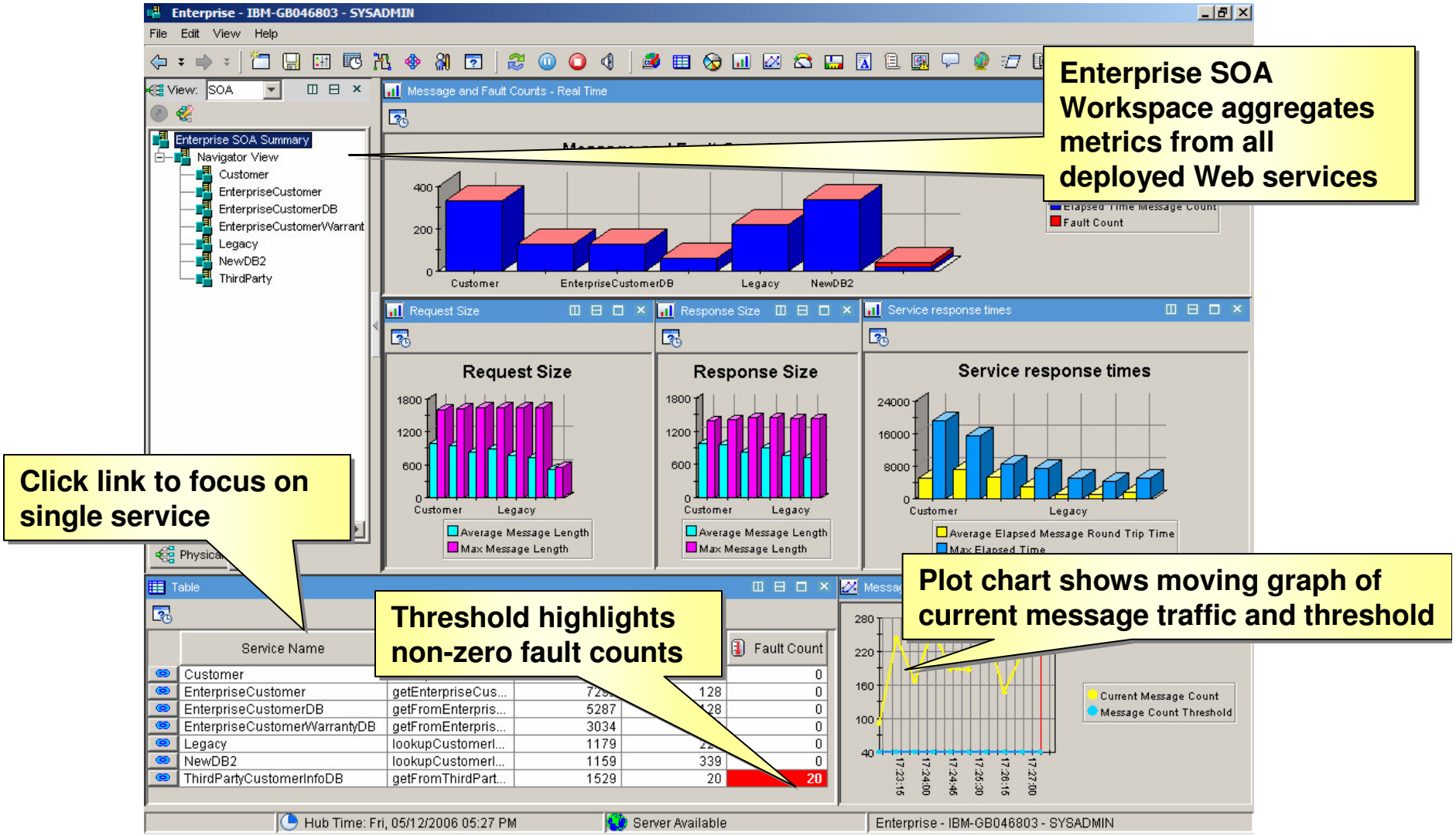


Emphasizing management early in the lifecycle

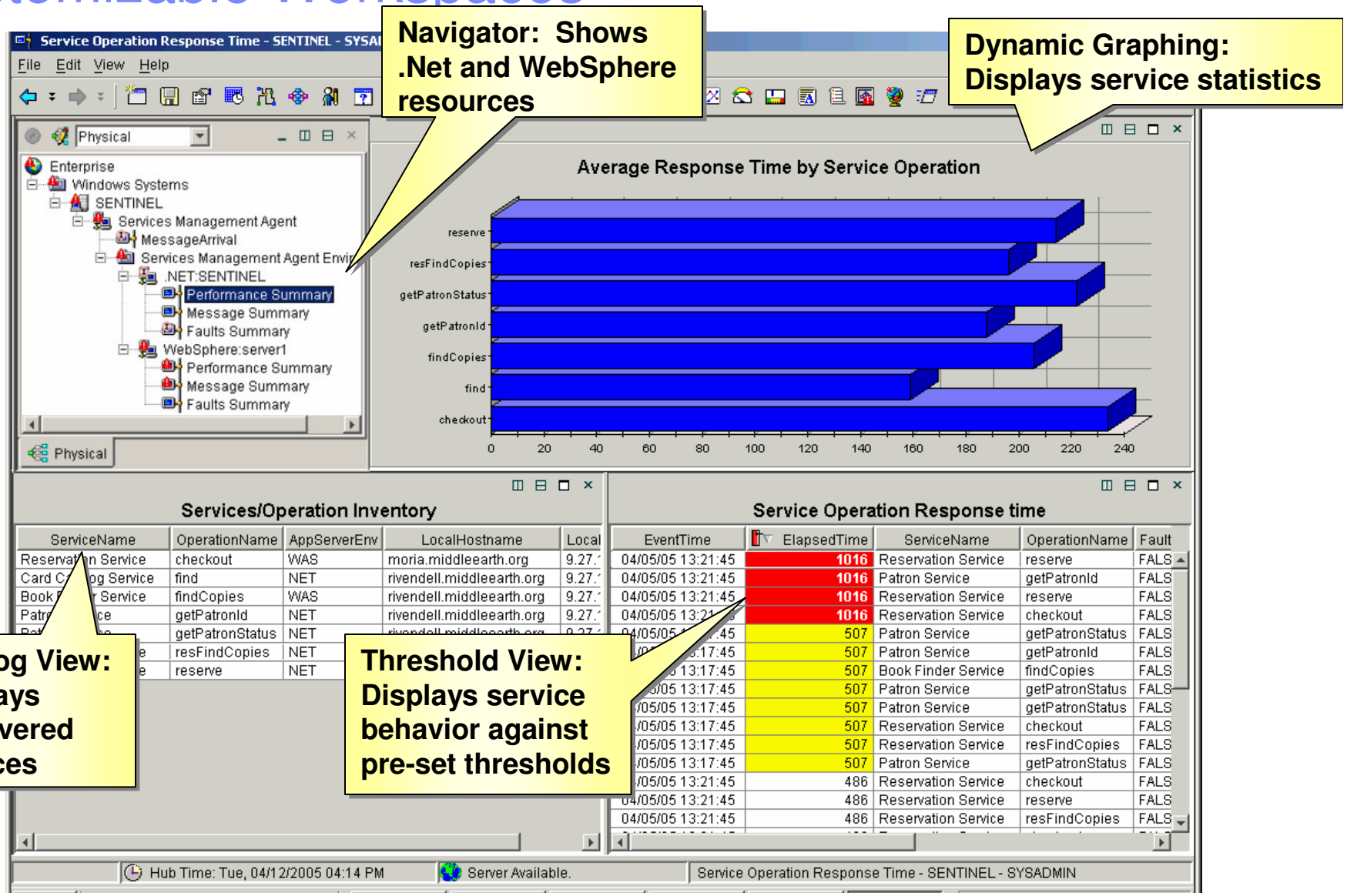
- ITCAM support of WebSphere Integration Developer (WID) provides the ability to place management control points (mediation) in ESB systems
- ITCAM for SOA includes workspace to configure these mediations once application is deployed
- Operators can take action to enable / disable managed mediations to support runtime changes to the management policy



Integration with Tivoli Enterprise Portal

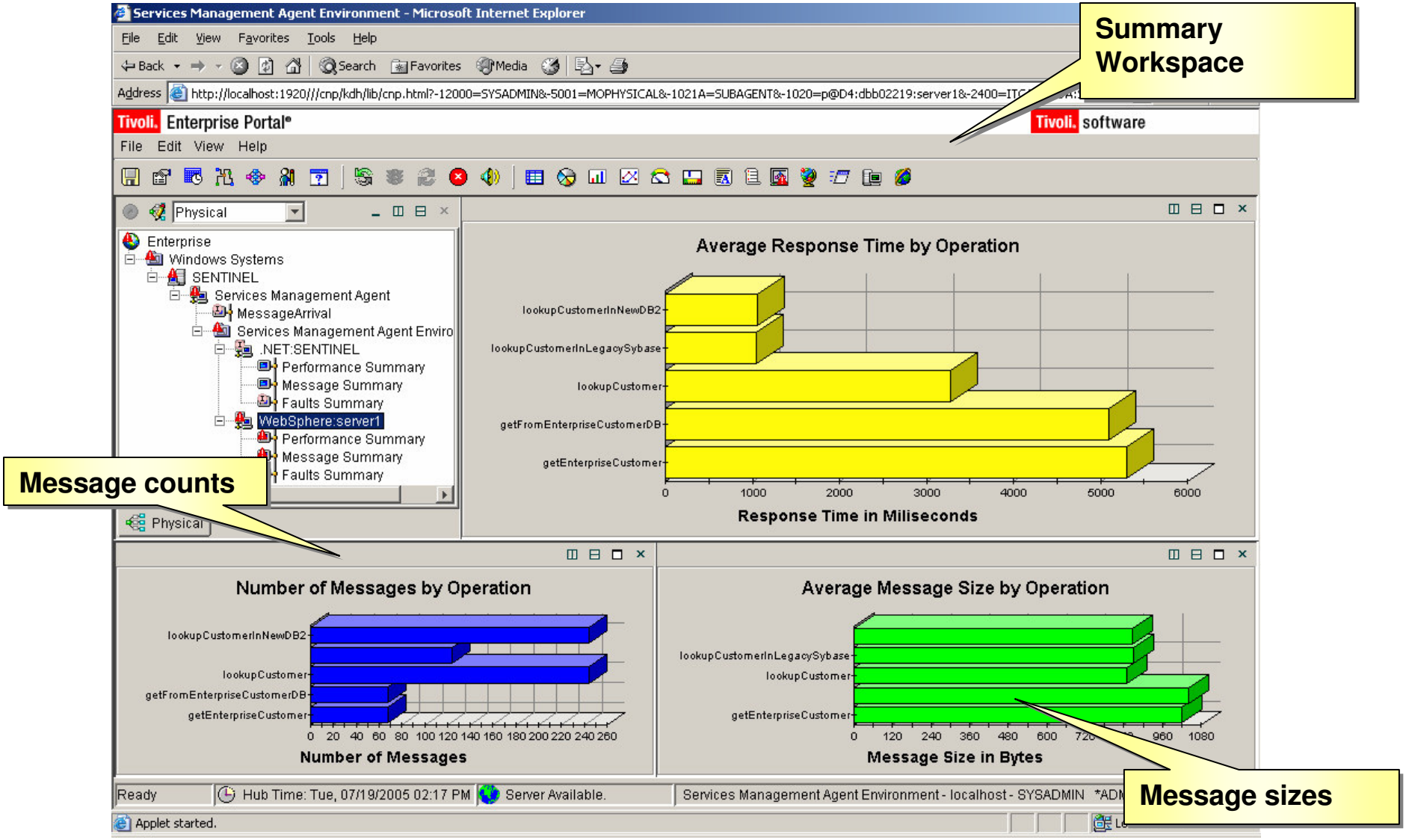


Customizable Workspaces



Value: Quickly drill down into the performance of Web Services

Customizable Workspaces



Make Production Data Available to Developers!

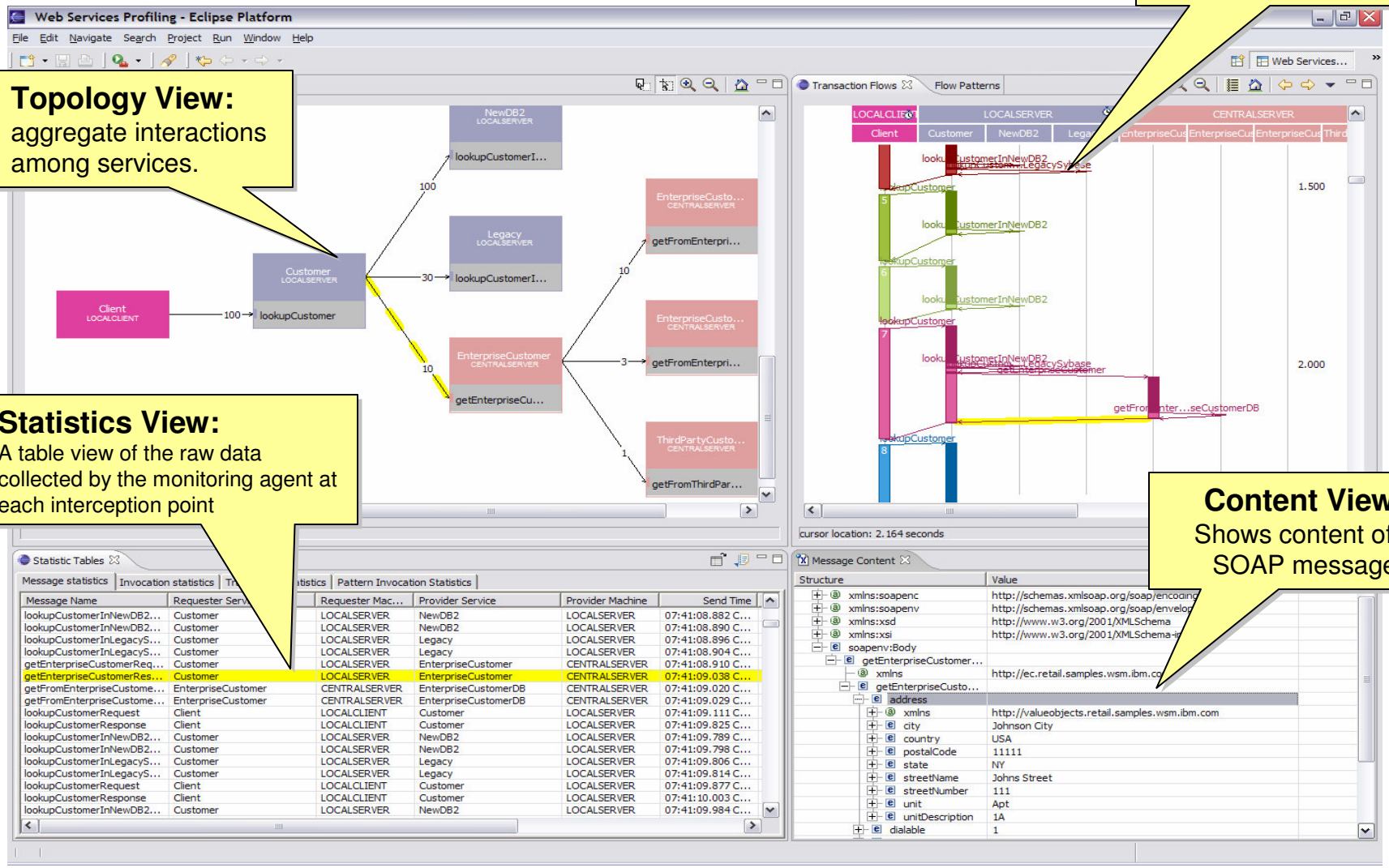
ITCAM for SOA – Web Services Navigator

Sequence Diagram:
Shows exact sequence of messages over time

Topology View:
aggregate interactions among services.

Statistics View:
A table view of the raw data collected by the monitoring agent at each interception point

Content View:
Shows content of a SOAP message



Life cycle management

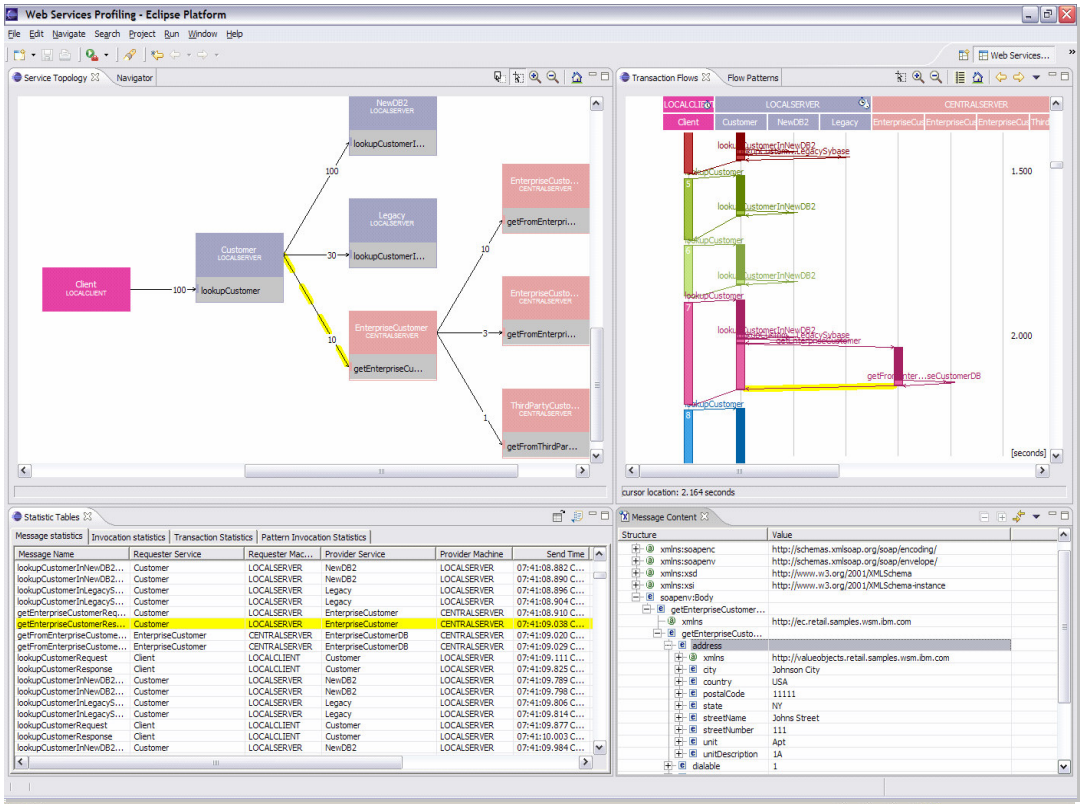
Bridging Operations and Development

Problem

- Web service response times are occasionally long

Solution

- Operations (using ITCAM for SOA) notice Web service response times occasionally exceed thresholds and some messages are exceptionally long
- Development uses Web Services Navigator to analyze and finds one external user is sending over-length messages
- Operations automate rejection of messages from the responsible user



Value

- ITCAM for SOA enables users to protect their publicly accessible Web services from accidental or malicious misuse

ITCAM for Response Time Highlights

Unified Infrastructure and User Interface
- Single infrastructure built on ITM
- Single, consolidated user interface built on Tivoli Enterprise Portal (TEP)

Improved Consumability to Enhance Ease of Use and Time to Value
- Fully customizable dashboard, reports and workspaces
- Simplified configuration, including default Situations
- Simplified installation
- Intelligent alerting based on ITM powerful situations editor
- Configurable data aggregation as low as every 5 minutes

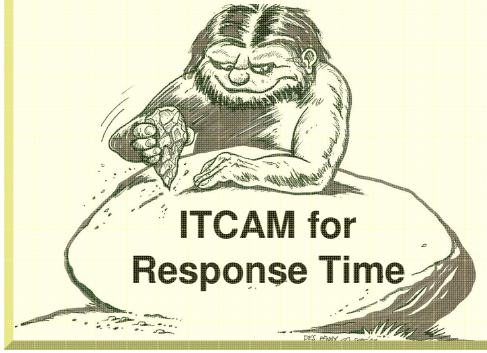
Enhanced Response Time Monitoring
- Report & alert on any real time or historical response time metric
- Identify response time bottlenecks by Client, Network or Server times
- Identify, report & alert on individual clients or locations
- Discover, report & alert backend server resources
- Improved robotic monitoring w/ Rational Performance Tester (RPT)
- Immediate playback of robotic scripts
- Custom ARM application response time monitoring
- Improved CLI functions to edit configuration

Deliver IBM Service Management Foundation Elements
- CCMDB discovery & real time status of Business Processes & Business Activities

You can install ITCAM for RT and have it show real web response time data within minutes!
(Really!)

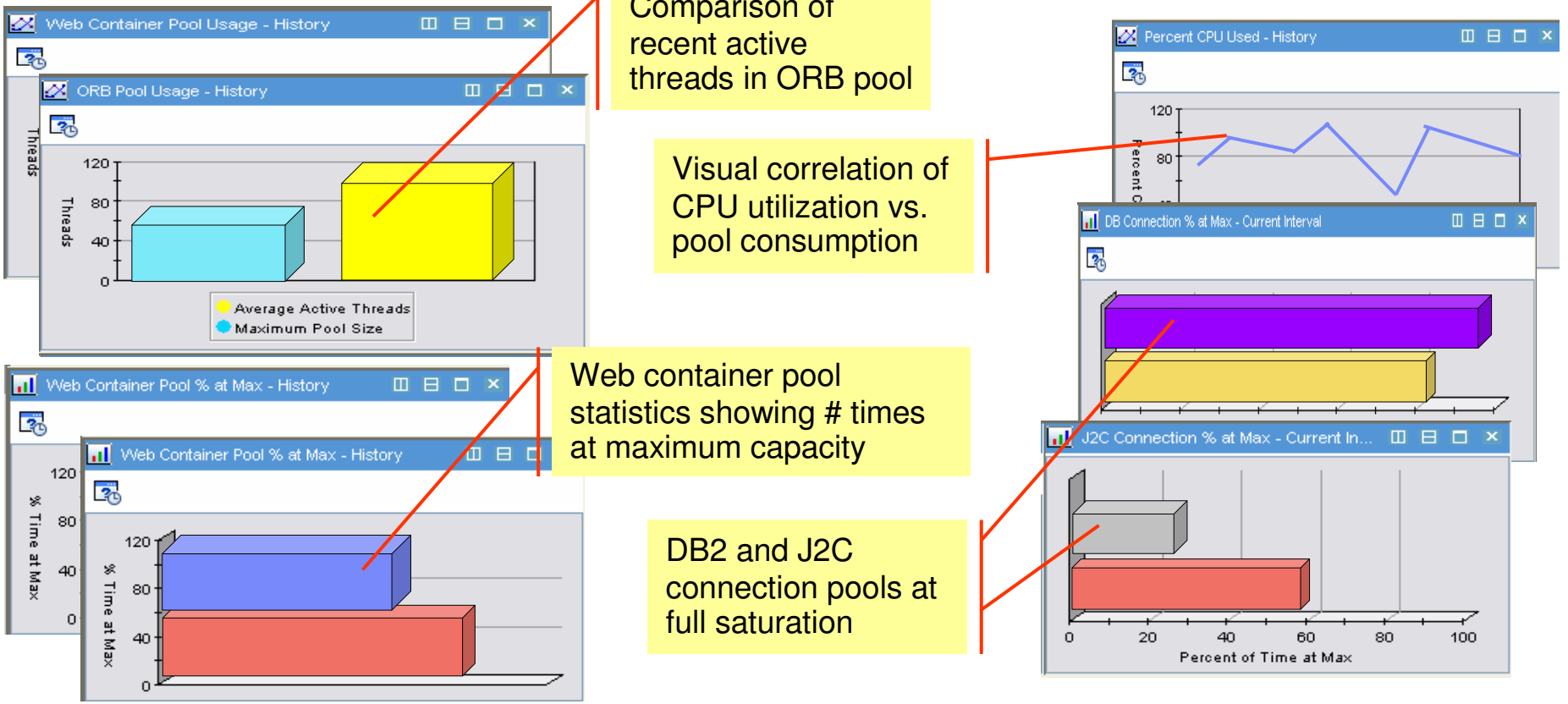
ITCAM for RT is so easy to run on top of ITM that even a (you guessed it)

A Neanderthal could do it



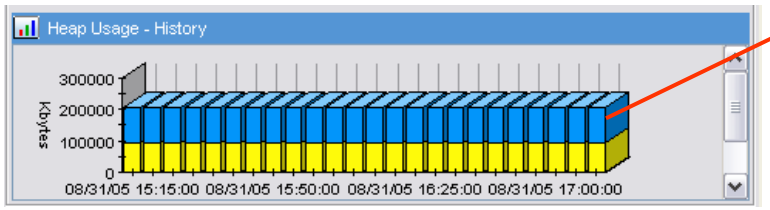
ITCAM for WS/J2EE/Web Resources – ITM/TEP Workspace

- J2EE resource pools are critical in terms of providing availability to commonly accessed services such as database access and other container pool types. This workspace enhances PMI data with configuration data to provide a comprehensive overview of requests flowing through WebSphere "funnel".



Garbage Collection Analysis

- Garbage Collection (GC) metrics such as frequency and time to complete can have a large effect on application server performance (during this time no other application processing can take place). This workspace shows a detailed breakdown of GC behavior and provides an complete analysis of GC performance metrics.

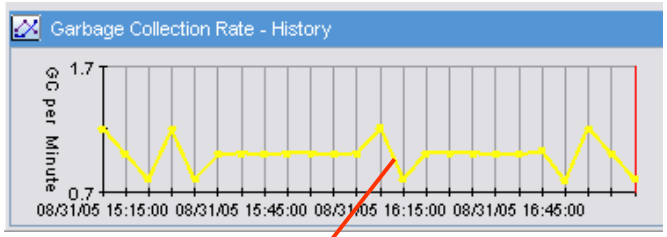


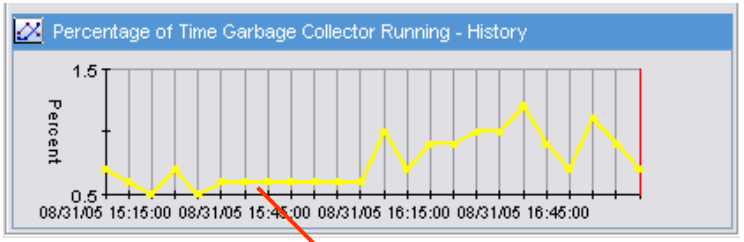
Recent JVM Heap Usage Trend

Detailed Analysis of Recent GC Performance

Garbage Collection Analysis

Sample Date and Time	Interval (sec)	Process ID	Times Run	Objects Freed	Objects Moved	Kbytes Total Freed by GC	Kbytes Used	Kbytes Used Delta	Kbytes Free	Real Time (ms)	Real Time (%)	GC Rate (per min)
08/31/05 17:14:00	59	78764	0	0	0	0	107339	15923	102440	0	0.0	0.000



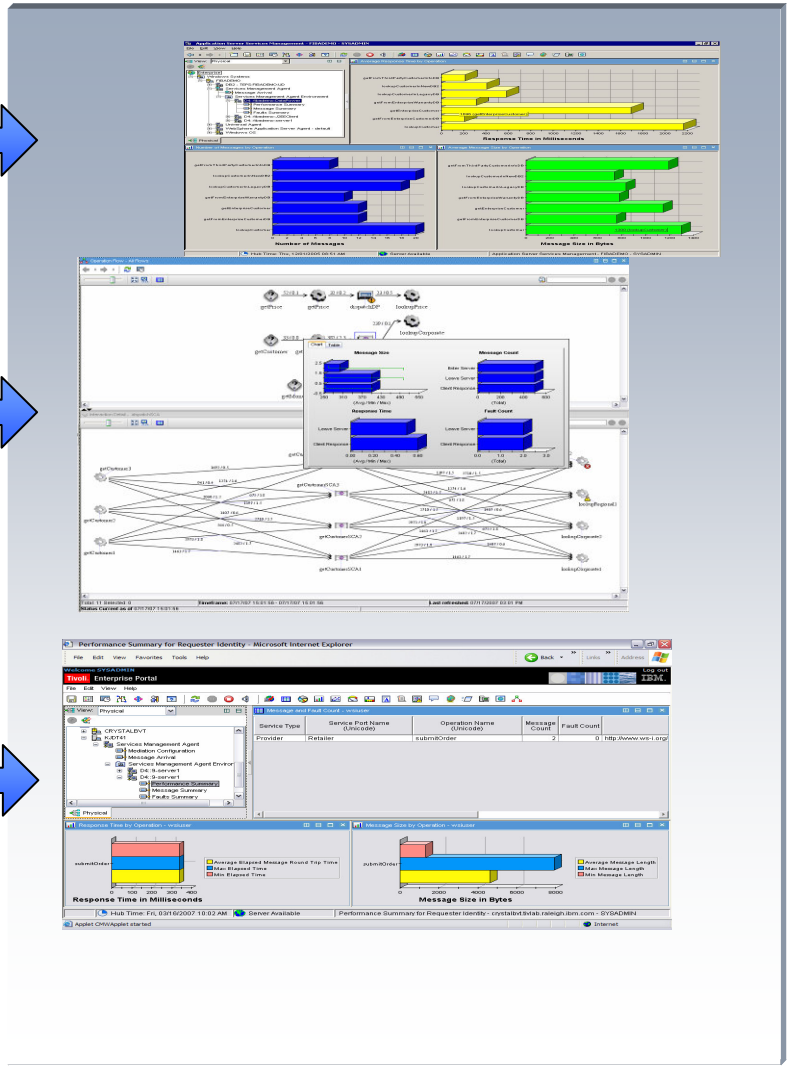


Collection Rate - # GC's per Minute

% Time Spent in GC Cycle

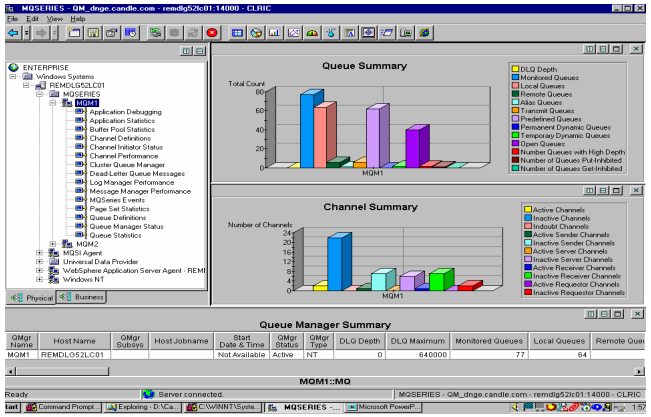
ITCAM for SOA 7.1: "Simple, Straight-forward, Clear understanding of your SOA"

- Enhanced Platform Support
  - CICS TS 3.2, WebSphere Message Broker
- Services To Services Topology Support
  - New visuals and aesthetics for the services to services relationship
  - Aggregate metrics on the relationship
  - Status of the operation
  - Discovered operational flow
  - Support for all monitored containers
  - Cross product launch from the topology views to other products
- Views Based on Service Requesters
  - Track performance based on requesting client (user id or the remote IP address of the invoking client)
- Easy Cross Product Linking
  - Provides cross product launch capability to diagnose and resolve problems



OMEGAMON XE for Messaging

- **Decrease WebSphere MQ and Message Broker Downtime**
  - Identifies common problems and automates corrective actions
  - Auto-discovery and immediate monitoring of complex environments
  - Drill-down to locate problem, identify root cause and resolve bottlenecks or outages
- **Proactively Prevent Problems**
  - Correctly configure and deploy your WebSphere MQ infrastructure
  - Detect and repair problems as they happen, or alert you to an imminent concern
  - Provides key MQ and Message Broker metrics for real-time and historical data analysis
- **Simplified Management with Single Tool**
  - Manages WebSphere MQ and Message Broker in distributed and mainframe environments
  - User-customized displays including business, platform and resource views

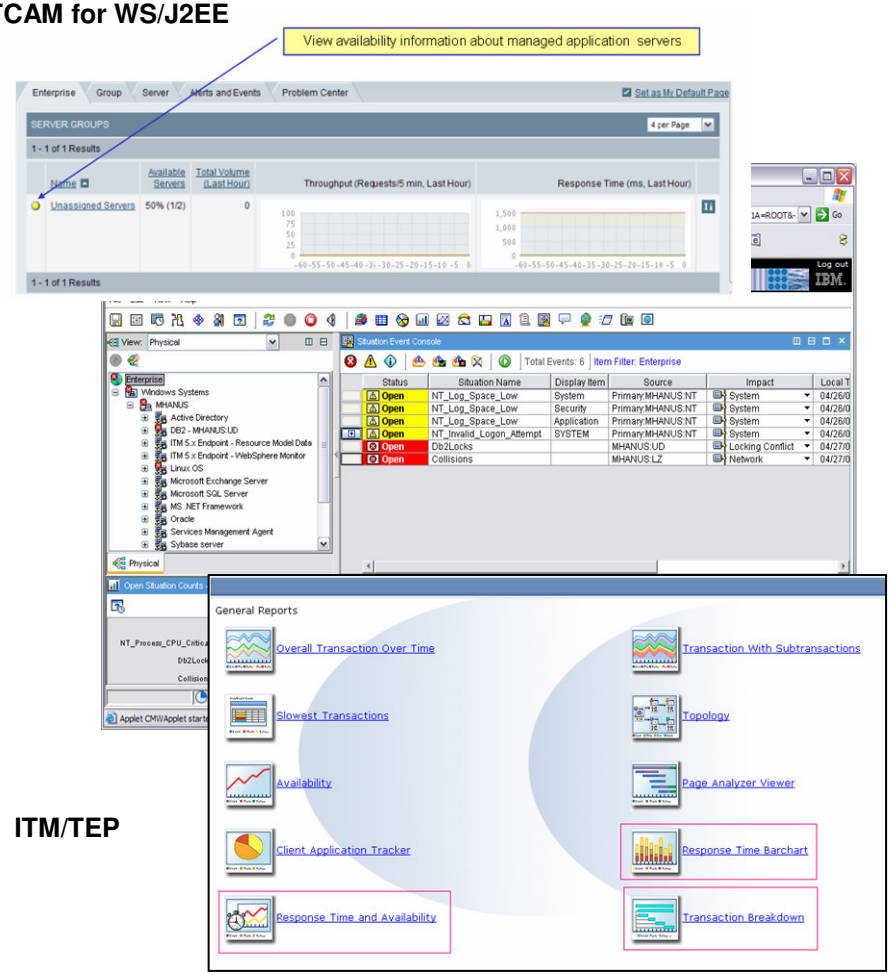


OMEGAMON XE for Messaging

- **One Product to Manage WebSphere MQ and Message Broker**
  - Supports distributed and mainframe systems
  - Analyzes application performance and identifies slowdowns
  - Comprehensive monitoring of input/output message rates, brokers, message flows and sub-flows
  - End-to-end view across all systems
- **Expert Advice – Based on Industry Best Practices**
  - Detailed information about what triggered the alert plus Expert Advice suggesting possible solutions
  - Corrective resolutions can be implemented automatically, or select and apply manual actions
  - Real-time and historical data analysis

ITM and ITCAM Availability Dashboards

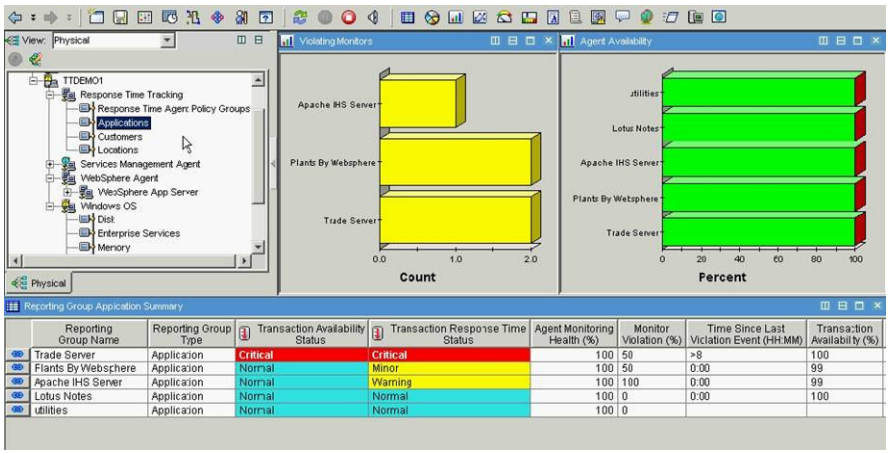
ITCAM for WS/J2EE



ITM/TEP

ITCAM for RTT Reports

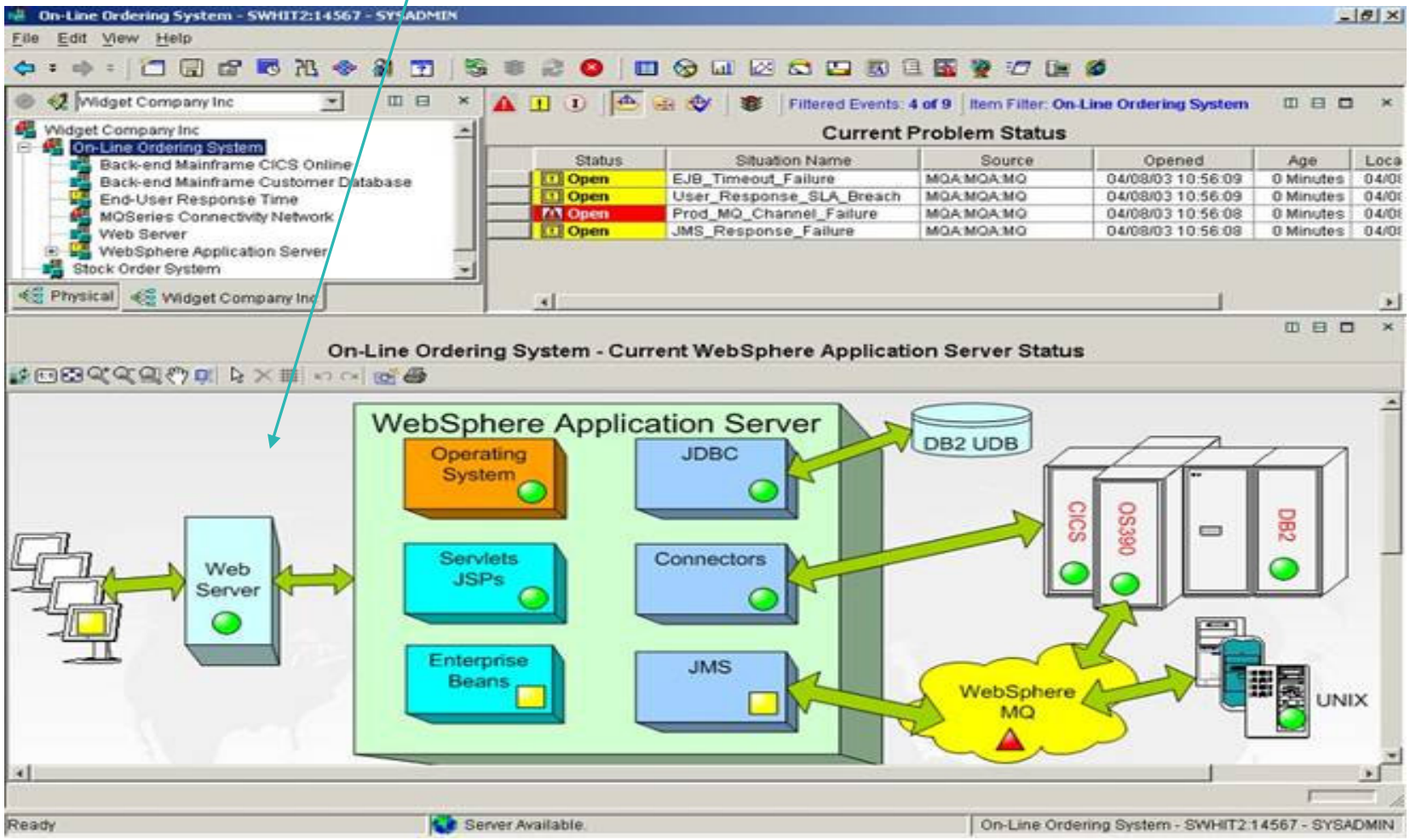
- Number of visual indicators to show availability of systems, application servers, applications, service etc.
- Automated take actions to mitigate critical situations ensure high availability
- Various Availability Reports available in ITCAM for WS/J2EE



ITCAM for RT/RTT workspaces in ITM/TEP

Create customized dashboards in Tivoli Enterprise Portal for Availability

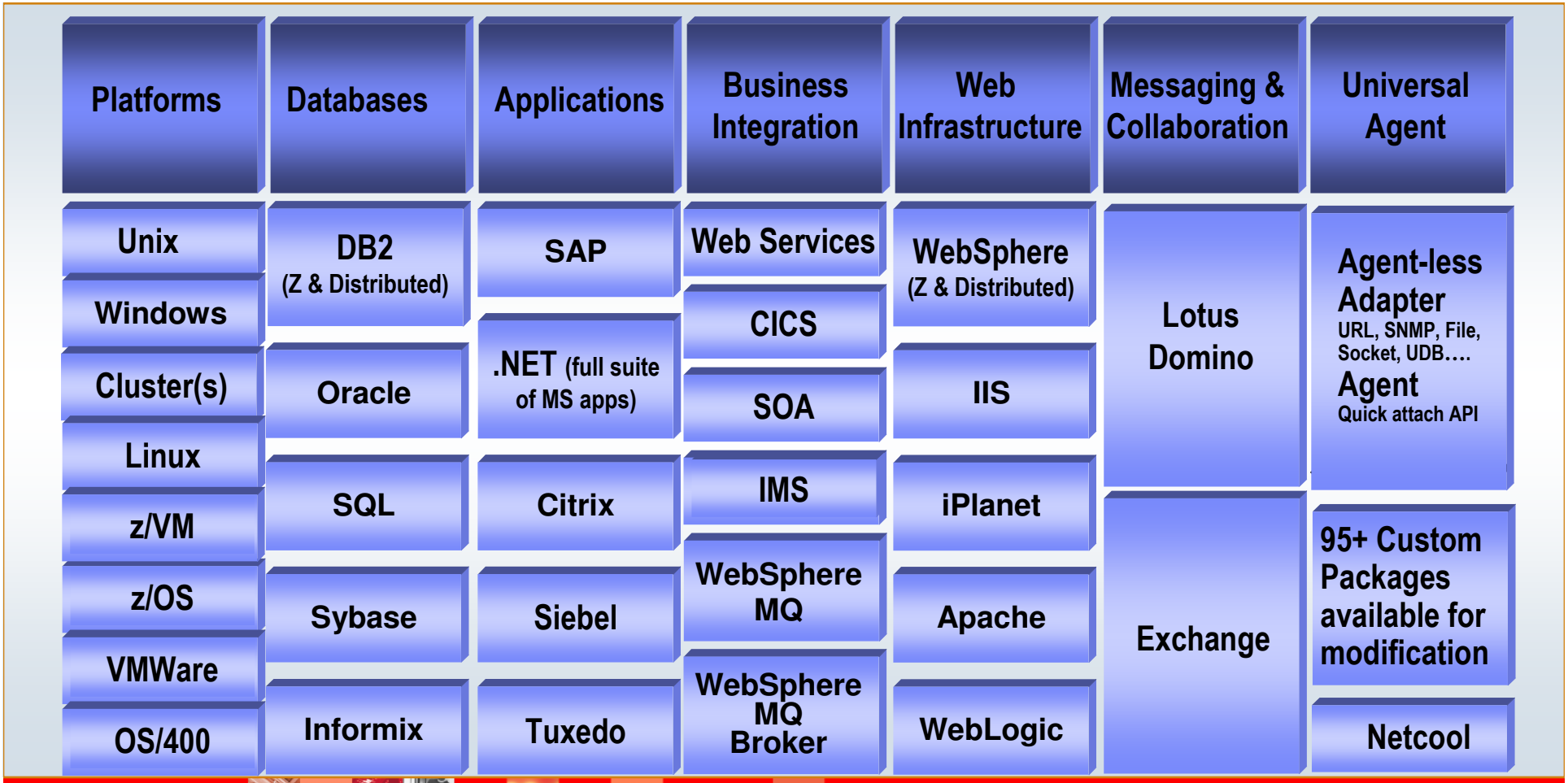
Monitor using TEP **customized** graphical view for visual correlation across WebSphere/J2EE system and components



Integrated End to End Support for Heterogeneous Environments

Available with IBM Tivoli Monitoring 6.1, OMEGAMON & Composite Application Manager

IBM Tivoli monitoring spans the breadth of your IT environment



Summary

- IBM Tivoli Composite Application Manager for SOA
  - Identifies service problems and speeds resolution
  - Automates service management and mediation
  - Supports heterogeneous SOA platforms
  - Integrates into Tivoli Enterprise Portal
  - Helps manage the SOA life-cycle
- Simplifies SOA application management
- Minimizes support and deployment costs
- Achieves a rapid return on investment

Tivoli: Delivering on SOA Management


Questions


Thank
You